CHEMICAL INDUSTRIES

VOLUME XXXV NUMBER 5

Our Three Hundredth Anniversary

HAVING glorified the American chemist at their Century of Progress meeting in Chicago last year, it is becoming that the American Chemical Society should fittingly celebrate the accomplishments of our American chemical industrialists at their meeting in New York next Spring. The occasion is a happy one, for 1935 is the three hundredth anniversary of the first serious American chemical enterprise by John Winthrop, Jr. The meeting place is most appropriate, for New York is our commercial chemical headquarters.

A gathering of five thousand chemists, with a program built around the economic aspects of chemistry, will create a golden opportunity to secure wide-spread and highly favorable publicity for the industry. The mere fact that the tricentenary of the industry is being celebrated will come as a shock to many Americans who believe chemical manufacture is a war-baby we kidnapped from Germany under the protecting guns of the British navy. We suspect that even a goodly number of chemists will be surprised to learn that our chemical production—measured in dollars or in tons—is three times that of Germany, four times that of Great Britain, and probably half of the entire world output. Even many chemical industrialists may not appreciate our record of growth, low prices, and large employment at high wages, which Mr. Derby in his article in this issue points out. If the coming A. C. S. meeting does no more than to establish these plain facts in the minds of our fellow citizens, it will have done a worthwhile educational work.

It can accomplish much more, and Messrs. Lammot du Pont, E. M. Allen, and George W. Merck, who have been named by the Manufacturing Chemists' Association to co-operate with the Committee of the American Chemical Society, headed by Professor Arthur Hixson, have shouldered a pleasant responsibility, which they are well qualified to carry forward to creditable and profitable achievement. The chemists have an ambitious plan to whose success the industrialists can contribute not only financial backing but business experience. And more hearty support of the national society of our technical men by our chemical businessmen would be a good thing all round.

Simplification and Standardization Harking back to the days when Mr. Hoover was Secretary of Commerce in President Coolidge's cabinet, this once popular slogan seems very quaint and old fashioned. Yet the idea behind it was sound as evidenced by its vitality; and although the chemical industry never rushed into a campaign to simplify its grades upon some deliberately thought-out system, or to standardize its containers according to a program of logical convenience and economy, nevertheless, much has been done.

Last August a serious effort was begun towards reducing the multitude of grades under which the fertilizer industry markets its wares. Sensibly the first step was wisely taken to study the existing situation as revealed by the filing of open price schedules. This survey is, we understand, completed, and the more serious work of real simplification is about to be launched by the National Fertilizer Association through the Zone Committees set up in connection with code administration work. Again the wisdom of forethought is evident, since the problem revealed by the survey is shown to be largely regional; that is, the brands offered in adjoining states of similar agricultural types are frequently the same.

A few figures show how luxuriant has been the growth of these brands. In the state of Florida alone four hundred and eighteen are offered for sale. At the opposite pole stands fifteen brands marketed in Arkansas. The average number of different brands on sale in the different states is one hundred and eight. The objective of reducing this to the Arkansas record is possibly too ambitious; but any progress will be a move in the right direction towards simplifying the highly complicated fertilizer distribution problems.

Our Own House of Chemistry In Paris, recently, the "House of Chemistry" was opened with appropriate ceremonies at which Elon Hooker represented our American industry. It is preeminently fitting that Americans should have contributed to this international chemical club and library, and Mr. Hooker's delightfully graceful speech on our behalf will be warmly seconded by both scientists and industrialists.

This French accomplishment should serve to remind us that we, too, need a national chemical headquarters, and that happily we have in New York City a Chemists' Club that is the very live nucleus which, fostered, can grow into a very vital force. Socially, it is indeed the heart of American chemistry. It is the common meeting place of leaders from laboratories, plants, and offices all over the country, and daily it performs a great service in cementing a real chemical *esprit de corps.*

These social assets are cherished by its members and obvious to all the chemical community; but there is in connection with the Chemists' Club a technical and commercial asset which, though highly valued by a few initiates, is not generally recognized.

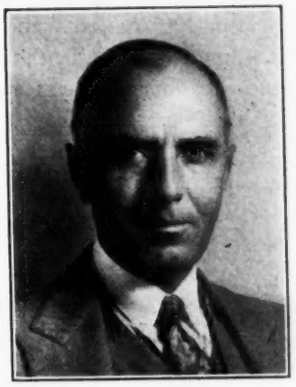
The library in the Chemists' Club ought to be the greatest chemical library in America, one of the great chemical libraries of the world, a complete storehouse in which, especially, one would surely find the odd, the rare, the costly publication. As such it would save much time and a great deal of duplicated expense. To become such it needs more of everything that makes a most useful and usable library—more staff, more shelf-room, fuller indexing, a large fund for purchases.

What Price Prosperity? It is a grievous injustice to say, as some Republican spellbinders have claimed during the recent campaign, that nothing has been accomplished during the first half of President Roosevelt's administration. The public debt and the number of public employees have both reached all-time peace records. The Government has gone into the power business and the manufacture of chemicals. It has invested three billion dollars in mortgages, and has entered private commercial banking. It has assumed regulation of security trading and over telegrams and telephones. In a word, the Government has enormously expanded its powers and functions, extending direct executive control over currency and credit, competing directly with its citizens in many fields, regulating labor, industry, trade, and agriculture.

Had all these encroachments upon individual initiative put recovery in the United States indubitably far beyond the revival of prosperity noted the world around, the sum of these experiments might be judged to have been worth the staggering cost in dollars, and the country would logically conclude that the reforms of the New Deal were wise and necessary steps towards a new, planned and controlled economy. But the record shows we lag far behind all other first-class nations in recovery, and it is right and reasonable that these expensive experiments cease.

Harry L. Derby Discusses

Salesmen's Opportunities



As Chemical Emissaries

IF a thoroughly accurate curve might be plotted of the general state of activity in all our industries, you could not see daylight between that line and a curve representing the sales of chemicals. That is just a roundabout way of saying that chemicals are today used by all our industries, and that the activity of the chemical industry reflects with great exactness the condition of all American industry. Put still another way, we all know that no factory in the country could operate a day without certain chemical supplies; and as a result, chemical salesmen are calling regularly upon every industry. No other group of men have such wide and favorable contacts with so many lines of business.

This creates a splendid opportunity. But it also carries with it a serious responsibility.

In the first place, without salesmen we would have no chemical industry. I am not disparaging the work of the technical or operating staff when I repeat the old truism that it is easier to make goods than to sell them. Therefore, without efficient salesmen there would be no necessity for any kind of a laboratory or plant. That's quite a responsibility in itself, when you remember that the American chemical industry has a plant investment of over a billion dollars.

But when the salesman makes a sale, his responsibility does not end there. His work is not over when he turns in an order or gets a signature on the annual contract's dotted line. He is out on the firing line and he must bear the brunt of the battle.

If a drum leaks or a carboy cracks, does a customer complain to the shipping department? He does not: he bawls out the salesman.

If a shipment is delayed, the traffic manager gets a telegram; but the salesman, on his next visit, gets a verbal beating.

If the credit department writes an insulting collection letter, who is it has the diplomatic task of smoothing down an irate customer?

Therefore, in our own company, if I may be pardoned a personal reference, we insist that from the reception clerk and the office boys up to the top, throughout every department, we all do our best all the time to support the salesmen. That is why also, when something does go wrong out in the field, I believe that the salesman is ninety per cent. right. In reviewing the action of any salesman, it is always safe to bear in mind that, first, he would not, for the sake of his company or for the sake of his own position, make a deliberate, wilful mistake; and second, that a mistake in judgment on a decision that had to be made on the spur of the moment, often under heavy fire, is a very different thing from a decision made back in the office with plenty of time and no outside pressure. It is easy to criticize, but it is unfair to compare deliberate judgment with all the facts in hand and a couple of hours to think through the consequences with snap judgment such as the salesman must use instantly.

And yet it is just because the salesman is always out on the firing line, daily calling upon men in all sorts of industries, that he has the wonderful opportunities that are his. Every real salesman—omitting the order-takers who are quite a different class of men—every real salesman knows his first job is to represent his own company. To the majority of the men he calls on, he is that company. How he acts and what he says presents the standing and the policy of the company that sends him out. In many cases the salesman is the only point of personal contact that the customer has with the chemical manufacturer, and the company is judged entirely by its representative.

Chemical salesmen are fortunate indeed, in representing the high type of corporation that comprise this industry. With no exception the chemical manufacturing companies are thoroughly representative of the best in modern American industry. They are good companies, reliable, well managed, able to fulfill all their proper services and able also to redeem their pledged word. They are, I will admit, aggressive competitors; but they are honorable competitors.

Besides being the responsible representative of his own company, a chemical salesman is the emissary of the entire American chemical industry. In constant touch with every other industry, this gives him a great chance to make clear to the whole country the

key position occupied by the chemical industry, and to explain the problems and policies of this industry of ours upon which all other industries have come to depend. I do not mean ballyhoo or propaganda; but sincere educational work.

The real foundations of our chemical industries were laid down during the eighteen eighties. Naturally there was a great expansion of all branches of the industry during the War. Since the War we have built up a huge chemical structure on these solid foundations. Woodrow Wilson recognized the national importance of an American chemical industry, and its vulnerability to dumping and price cutting; and he insisted at the outbreak of the War that our national policy should always be to provide tariff protection sufficient to insure an independent chemical industry in this country adequate to supply our industrial needs and the means of national self-defense. That policy is just every bit as essential this very day as it was in 1917. It is our duty therefore, to ourselves, to our industry, and to our country to see to it that the truth and importance of this policy is not forgotten, and to be on our guard that the judgment of our fellow-countrymen is not warped by worshipping false gods. The chemical salesman can see to it that industry generally maintains a correct perspective on the matter of tariff protection. Many of his customers may not—probably they do not—fully appreciate the vital importance of the tariff to the chemical industry or of chemicals to their own business.

Tariff and Chemical Prices

The bugaboo of high prices behind a tariff wall is easy to dispel. Did you know that the index of chemical prices shows conclusively that they are below, not the popular 1926 level, but the level of 1914? What other industry can point to such a record?

Some broad and important conclusions can be drawn from this price record to which the entire chemical industry may well point with honest pride. Chemicals and chemical prices are doing a grand work in lowering the costs of all sorts of goods, which is certainly one very direct and practical way of increasing the purchasing power of the consumer.

And it must be noted too, that lower chemical prices have not been made at the expense of the pay-roll. The wage level of the chemical industry is higher than in most other industries, and I believe it is a fact that no other industry in the land is employing today better than 95 per cent. of the men it had at work in 1929. That is the record of our chemical industries.

We can all be proud of these records. At a time when recovery is dependent upon higher wages and fuller employment, we are paying higher-than-average wages, and our employment is all but equal to the last of the boom years. It is also a substantial contribution to recovery to make such important industrial commodities as chemicals available at costs which are actually deflated to below pre-war values. Is there another industry can say as much? There is not. Without boasting, for this great triple record is but the natural development of great technical progress passed along to consumers by forward-looking management, under our system of free competition and high individual initiative, we should tell the industries of America the tangible services we are rendering to national prosperity and national defense. The chemical salesmen, as the official emissaries of this great progress, have an obligation to make these facts well known throughout the commercial community.

Industry's Bookshelf

Hydrides of Boron and Silicon, by Alfred Stock; 250 pages; Cornell University Press; $2.00.

Book is based on lectures given at Cornell through the George Fisher Baker Non-Resident Lectureship in Chemistry. Prof. Stock is a pioneer in the investigation of the little-known compounds of boron and silicon and his work is a real contribution to a division of the literature which has been greatly neglected.

Units In Chemistry, by Russell S. Howard; 756 pages, and appendix; Henry Holt & Co.

A textbook for beginners in the study of chemistry. Outstanding feature of the book is the rather novel and revolutionary means of approach; the subject matter is divided into 8 major divisions or units. These are more than chapter headings; each is a center about which is grouped contributing knowledge in order to bring about a well-defined understanding of chemical fundamentals.

Colloid Chemistry, by Arthur W. Thomas; 512 pages; McGraw-Hill Book Co. $4.00.

A clear, logical treatment which aims, as far as possible, to account for colloid interactions on a simple crystalloid basis. Text covers biocolloids as well as inorganic dispersions. Every day techniques are carefully reviewed; chapters on soaps and carbohydrate colloids are included; and chapters on proteins and emulsions are more extensive than usual.

Money and Banking, by Louis A. Rufener; 788 pages; Houghton Mifflin; $3.50.

Subjects chosen by writers on economics seem to move in cycles; last year it was the "New Deal"; this year it is money and banking. Book, while fundamentally serving as a text book, is well-adapted to the needs of the business executive looking for authoritative information. Rapid developments of the past few years require that the problems of money and banking be restated and interpreted. An important feature is the illuminating analysis of the history of our financial institutions.

Chemical Engineering Catalog, 19th edition, 1934, Reinhold Publishing Corp.; 779 pages.

Completely revised in content, but maintaining the usual 3 divisions, the 19th edition of this standard catalog is now being distributed. Part 1 is a condensed and standardized catalog data of equipment, machinery, laboratory supplies; second section is devoted similarly to fine and industrial chemicals. Classified indexes of both equipment and chemicals, carefully cross-indexed, are provided. In the 3rd section is a very complete list of books in English on chemical and related subjects.

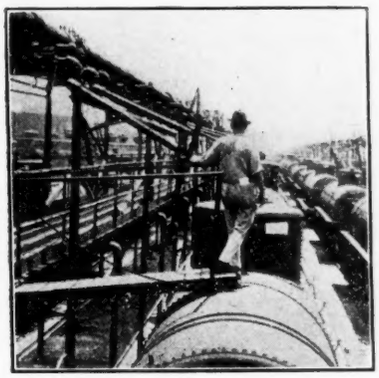


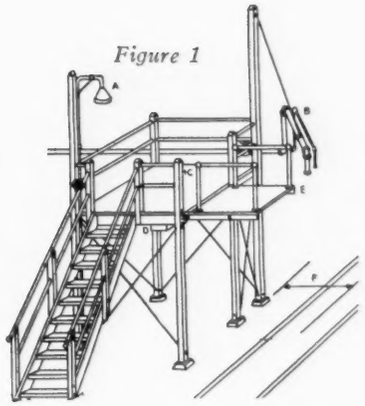
Figure 2

Safety In Unloading Tank Cars

By A. C. White

Technical Sales Division, Dow Chemical Company

Figure 1



DUE to the impetus our industry received in this country during the World War, to the progressiveness and ingenuity of car building companies, and the fact that by reason of the vast quantity of petroleum products carried by rail America has always been tank car conscious, this method of transportation for a wide range of commodities has been successfully and rapidly adopted.

It is inevitable that when some new process or means of transportation arises, a revision of the methods used in handling the materials is necessary. The increase in the use of tank cars for the transport of many products never before handled in this way has called for new practices in loading and unloading such equipment.

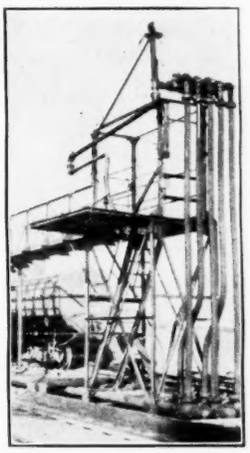


Figure 3. A modern unloading station.

Products handled in tank cars, and their modifications, are legion, and to attempt to compile a complete list of such would, by the date of publication undoubtedly be incomplete or out of date. These range from helium gas to bulk cement; from maple syrup and ice cream to aniline oil. Fortunately a substantial percentage of the materials carried can be classed as harmless; food products such as vegetable and animal oils, syrups, fruit juices, milk, beer, and certain chemical loadings, such as calcium chloride and sodium chloride brines.

The very simple rules for unloading tank cars laid down by the I.C.C. and the Bureau of Explosives, published by the latter in their Pamphlet No. 9, entitled "Regulation for the transportation by rail of explosives and other dangerous articles, etc.," should serve as a fundamental ground work upon which any specific recommendations should be considered as elaborations and not as substitutes.

At the unloading station a substantial hinged walkway should be provided. Fig. 1. This should be long enough to reach well over the center line of the car and be equipped with a substantial hand rail. A toe board around the bottom of the working platform is most desirable as it prevents objects from falling on men who may be working below.

Remember that even with so called "harmless" loads "no tank car is ever empty" and offers the same potential danger from its possible content of explosive and suffocating gases as any other closed tank. Only electric hand lanterns or flash-lights should be used to inspect tank cars, either when empty or full, and if necessary to remove the manhole cover, the opening should be covered with a wet burlap or wet canvas to prevent possible ignition from sparks. This precaution should be taken with all loads, whether considered hazardous or not.

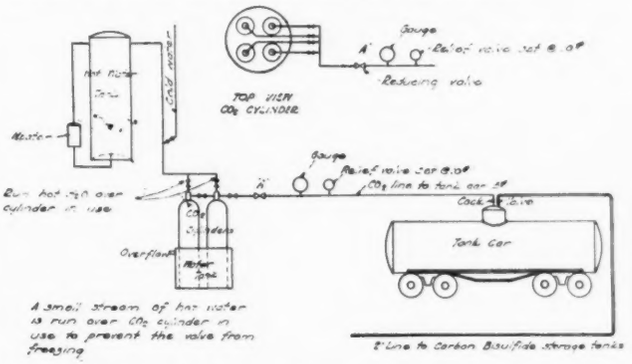


Figure 1, top right, type of unloading station, showing arrangement of hinged walkway and unloading pipes. Figure 2, close-up of walkway, long enough to walk to center line of tank, and carrying guard rails. Above, Figure 3A, diagrammatic sketch showing hook-up for use of CO_2 gas for pressure unloading.

(A) Permit no one to enter a tank car—even after it has been thoroughly cleaned, unless wearing a fresh air hood or a hose and blower type of mask. The person entering should always wear a life belt provided with a strong life line, and at least one helper should be stationed at the manhole continuously while some one is inside the car. Extra help should be quickly available in case of necessity.

If it is necessary to move a tank car after the unloading has begun, the manhole cover and all bottom connections should be tightly closed.

It is always good practice to ground a tank car which is being loaded or unloaded, but in the case of flammable solvents and such materials as gasoline, naphtha, benzol, etc., it is highly important that this be made part of the standard practice.

Thawing Tank Cars

In many cases, at least during the colder weather, it is necessary to thaw out a tank car load which has become wholly or partially solidified. Procedure for this operation will depend upon the load and degree of solidification. No car should be thawed by *any* method until provision has been made for venting the car by opening special vents or loosening the manhole cover and blocking to allow any excess pressure to escape. *All* cars, whether they require thawing or not, should be vented at the time of unloading before any connections are made.

(B) There are several methods of heating tank cars so as to thaw their contents. The most general is to apply low pressure steam to a set of coils which are contained within the tank itself. Careful shippers always select, for materials subject to crystallization or freezing en route, suitable tank car equipment which is provided with the proper coils. All steam coils in tank cars should be blown out with air pressure as soon as the thawing operation is complete, in order to obviate the bursting and freezing of the pipes. It is desirable, after starting to unload a thawed car during the winter, that the unloading be continuous until the car is empty. Partially filled cars are often much more difficult to thaw than when full, and it is very likely that the discharge lines themselves may be clogged with frozen or crystallized materials during the shut-down period. In the case of certain heavy liquids such as tar, molasses, etc., a special steam jacketed outlet nozzle has been devised, which, in some cases, is connected in series with the car coils, and in other cases is a separate unit by itself.

If necessary to apply steam to such a nozzle, it, too, should be thoroughly blown out before the plugs are replaced. In handling liquid gases, the necessary heating coils are placed outside the tank car shell under the outer lagging.

In the case of acid tank cars it is not feasible to provide the car with interior coils, which can be used for thawing those grades of acid which freeze readily in cold weather, and a steam heated thawing shed must be used to provide the necessary warmth for thawing the load.

(C) Carloads of solvents and volatile petroleum products should always be tested by raising safety valve to indicate whether there is any interior pressure on the tank. Dome covers must not be removed if internal pressure exists.

Operators engaged in loading and unloading tank cars should be thoroughly familiar with any special precautions which must be taken with each product. They should be provided with proper protective clothing, goggles, etc., and any special wrenches and similar equipment necessary. If samples are to be taken, special detailed instructions covering this should be furnished, and in the case of corrosive loadings, sampling utensils particularly adapted for the product should be furnished. Samples are usually taken in bottles and a wooden sample tray divided into compartments is useful in the prevention of breakage of bottles and possible falls or injuries from stepping on rolling sample containers.

A shower bath provided with a deluge head, and operated by a quick opening valve, should be installed on the ground level close to the unloading platform, but sufficiently removed so that liquids spilling over the sides of a car or escaping from a leaking dome discharge line will offer no hazard. Some companies have the shower water valve open when a man walks or falls on a treadle platform. This is valuable in cases where clothing is on fire or where a splash or spray of the load affects the eyesight. Suitable protection against freezing during the winter must be provided in the case of outdoor showers. This is usually done by having the valve itself either inside the building or below the frost line.

General Unloading Methods

For unloading liquids, only three methods are permissible.

(1) By Gravity Flow.
(2) By Pumping.
(3) By Pressure Displacement.

Before attempting to unload any tank cars, other than class 105A, care should be taken, by raising the safety valve, to see if there is any interior pressure in the tank. Dome covers must not be loosened or removed while such pressure exists. When pressure is found it should be reduced by spraying the tank with water or relieved by raising the safety valve at short intervals, unless the material contained in the car is flammable. If so, the car should be left closed until the following day, so that the lower night temperatures may assist in lowering the excess pressure.

After pressure is released the car seal should be broken and the dome cover removed. With screw type covers, loosening may be done by placing a bar between the dome cover lift and knob. After two

complete turns so that vent openings are exposed, the operation should be temporarily stopped to see if there is any sound of escaping vapor. If so, the cover should be again screwed down and its removal delayed until the escape of vapor through the vent openings cannot be heard. With bolted type covers, all nuts and bolts should be loosened, with the exception of the hinge bolt, one complete turn, and then additional turns until the dome cover can be opened for venting. During venting the screw type dome cover should be replaced directly over the dome opening, without engaging the threads, and with the bolted type of cover a small block of wood is placed under the edge of the cover furthest away from the hinge.

The gravity method of unloading a tank car is probably the simplest and can be advantageously used in all cases where storage tanks are situated below the bottom outlet of the car. Only products comparatively harmless in case of accident to pipe lines should be unloaded by this method. I.C.C. regulations prohibit the use of bottom unloading connections on cars used for the transport of acids and similar products. The following simple rules should be observed in using this method:

(a) Check positive outlet valve from top of car to be sure that it is tightly closed.

(b) Start removal of plug in bottom of outlet fitting with a suitable wrench, having a pail or other suitable container to catch any liquid which may have leaked by the positive outlet valve. If leakage shows upon starting to loosen plug, it should not be entirely removed, but sufficient threads to hold it loosely in place should be left engaged and enough time allowed to elapse to completely drain the bottom outlet fitting. If the leakage does not stop, the plug should be tightened and another method of unloading the car employed.

(c) When the leakage ceases the plug can be removed and a pipe nipple and gate valve attached to the outlet fitting. The gate valve should be open while being screwed into position, but can then be advantageously closed as an added precaution while the workman is engaged in connecting up the balance of the discharge line.

(d) When all connections are made the gate valve next to the outlet fitting is opened, and then the positive self-locking outlet valve opened by means of the valve stem or hand wheel located on the top of or inside the dome of the car.

(e) Air, to compensate for the load, must be permitted to enter the car either through an air relief valve, blocked open, or through a loosened and blocked up manhole cover.

(f) After car is empty the outlet valve should be tightly closed from the top of the car before the discharge connections are broken.

Unloading by Means of Pumps

(a) When storage tanks are above the tank car level or for conditions where gravity unloading cannot be used and it is undesirable to use air, the contents of a tank car may be transferred by means of suitable pumping equipment.

(b) Connections are generally made through the bottom outlets on a car, but if positive displacement pumps are used and the cars are so equipped, the top outlet connections may be used if desired.

(c) The precautions mentioned under gravity unloading should be observed for bottom pump connections and if desirable to utilize top discharge, it is merely necessary to connect the suction of the pump to the syphon pipe where it extends through the dome. It is always good to have a valve on the suction side of any discharge line.

Unloading by Pressure Displacement

(a) In general, air pressure is used to blow the contents of a tank car through suitable lines to the storage tanks, although in certain instances inert gases or even immiscible liquids are used for the purpose.

(b) Tank cars are hydrostatically tested at pressures sufficiently high enough so that the permitted pressure of 30 lbs. is always safe, but it is generally found that lower pressures give practically the same results except that a slightly longer period is required to empty a car. Pressures in excess of 30 lbs. should *never* be employed in unloading cars.

(c) After venting the car in the usual manner, discharge line connections are made to the syphon discharge pipe, care being taken to see that all joints are tight.

(d) In the pressure air line just ahead of the stop or shut-off valve, there is inserted in the order named (a) a pressure reducing valve with maximum setting of 30 lbs.; (b) a gauge reading from 0 to approximately 50 lbs.; (c) a safety pop valve set at *not over* 30 lbs., and (d) a regulating valve and the necessary union.

(e) After the discharge line is connected the air connection is made, the car vents closed and pressure applied to the car. When the car is empty the pressure gauge reading will fall, the air pressure is then released, and the air line and discharge connections are disconnected in the order named.

Dangerous Loadings

This classification must necessarily be very broad: it includes corrosive, explosive, flammable and poisonous loads, and, under even slightly varying conditions, nearly all tank car loads of chemicals may fall into one or more of these classes.

It cannot be emphasized too strongly that a buyer of any product should be thoroughly familiar with its physical and chemical characteristics, and whether or not there are any particular hazards connected with it to workmen, or his own or surrounding property. In addition it is highly desirable that those directly responsible for the unloading of equipment should be

thoroughly posted as to unexpected difficulties which may occur under extraordinary conditions.

Many companies who ship considerable tonnages in tank cars, realizing that they are more familiar with their product than the average user, are not only glad to pass out general technical information regarding the utilization of their products, but also issue special instruction bulletins on correct methods of unloading cars in which their products are shipped. This is particularly true of products which, under certain conditions, may have dangerous properties.

Corrosive Materials

Loading under this heading may be subdivided into acids and alkalies. They are generally in a liquid state, but under certain climatic conditions may become wholly or partially solidified during transit.

Acids: these are divided into two classes, organic and inorganic. The inorganic or mineral acids are the strongest of the two groups and comprise sulfuric, nitric, hydrochloric (or muriatic) and hydroflouric. Mixtures or dilutions of any one or more are transported today in tank cars instead of the glass carboys formerly used.

The organic acids are much weaker and as a class include acetic, lactic, formic, and the so-called fatty acids.

As previously mentioned, acid cars are not equipped for bottom unloading and are generally unloaded by the application of air pressures, as outlined above. In unloading cars which contain acids it should be realized that one of the principal by-products from the acid corrosion of a material is generally hydrogen, which, when mixed with the correct proportion of air, forms extremely explosive mixtures. For this reason extra precautions should be taken so that no lights or open flames are used near acid cars, whether full or empty.

In making air connections for the blowing of an acid car it is always advisable to blow out the air line before connecting it to the car, in order to remove moisture. The operator during this operation should stand clear of the air line so that he may not be cut with dirt or scale which may be present in the line.

(a) Sulfuric acid is by far the most important acid in the chemical field, in which it finds many uses, also in numerous other manufacturing fields. It probably enters into more products directly or indirectly than any other chemical product.

Under ordinary circumstances it is a liquid, although certain grades freeze during the colder months and the higher concentrations or so-called "fuming" acids solidify even at summer temperatures. In strong concentration it does not appreciably attack iron or steel, and tank cars constructed of these metals give entirely satisfactory service. Control valves, discharge lines, pumps, etc., used in unloading sulfuric acid cars should contain no brass or bronze fittings.

These cars should not be washed out nor dome covers left open as this acid has a great affinity for water and the resulting weak acid formed is very corrosive to any steel or iron construction.

(b) Nitric acid is a colorless, highly corrosive liquid which actively attacks nearly all commercial metals. Because of its corrosiveness on iron and steel, until very recently it has only been shipped in glass carboys. Developments in the manufacture of special alloy steels, however, have made it possible to ship this product in cars entirely constructed of so-called stainless steels or built with stainless steel linings and fittings.

All discharge lines, etc., should be constructed of materials suitable for handling this acid. Because of its decided tendency to fume when in contact with water, approved practice requires the emptying of nitric acid tank cars by pumping, and air should never be used unless special precautions are taken to render it entirely free from moisture.

Mixed Acids

(c) Mixed acids consisting of mixtures of nitric and sulfuric, except in weak concentrations, do not seriously affect iron or steel, and for that reason can be successfully handled in the ordinary steel tank car. Such cars should be unloaded by pumping.

(d) Hydrochloric (or muriatic) acid is today transported in rubber lined steel cars, although some of the wooden multiple unit tank cars are still in use. It should be unloaded by the use of air pressures through rubber lined pipes, etc. There are no extra hazards connected with the handling of this material over the precautions which have already been recommended for acid handling in general.

(e) Acetic acid finds its way into many markets in a number of different strengths, ranging from weak vinegar concentrations to glacial acetic and acetic anhydride. It can be safely handled in all aluminum tank cars equipped with aluminum heater coils to be used for liquefying the higher concentrations. Cars may be unloaded either by blowing or pumping through aluminum lines and fittings, taking the usual precautions for handling acids.

(f) Phosphoric acid in various strengths is shipped in rubber lined equipment.

(g) Hydrofluoric acid is shipped in special high-pressure steel tank cars. As it is extremely corrosive, and burns from this product are difficult to heal, particular care should be used not to allow it to come in contact with the skin.

(h) The organic acids are generally shipped in ordinary steel tank cars and offer no extraordinary hazards in unloading. Such materials as ferric chloride, sulfur chloride, sulfur dichloride, zinc and tin chlorides fall into the class of acids, and, lacking specific instructions, should be handled in the same manner.

To be continued in a coming issue.

Calcium:

Its Metallurgy and Technology

By C. L. Mantell and Charles Hardy

CALCIUM is an uncommon metal whose physical and chemical properties have been little appreciated and whose availability and applications have for the most part been unnoticed. In its commercial forms on freshly cut surfaces, calcium is white in color, approximating that of silver. Fractured surfaces are more brilliant than steel. Upon exposure in the presence of moisture, thin films of bluish-gray oxide form. These are protective against further attack. Unlike sodium or the alkali metals, calcium may be readily handled, allowed to come in contact with the skin without danger, and may be treated like magnesium and aluminum. The metal is ductile and malleable. It can be machined in a lathe, turned into shapes, drilled, threaded, sawed, extruded, pressed, hammered into plates, and drawn into wire. Its commercial forms include chunks, bars, shavings, rods, and, very recently, powders.

The physical and chemical properties of calcium are tabulated in Table I. Under a 500 kg. load, calcium shows a Brinell hardness of 17, while under the same conditions the figure is below 1 for sodium. Pure aluminum has a hardness of 25,[1] while magnesium is 30[2] to 32.[3] Machined sections of calcium show Rockwell B hardnesses of 36 to 40. Scleroscope hardnesses on commercial material are of the order of 11 to 12, and on purified material 19 to 20 as compared to 20 to 23 for magnesium.

Calcium cannot be cast by ordinary foundry methods, as it oxidizes readily at elevated temperatures. Oxidation is exceedingly rapid at its melting point, 810° C. Melting and casting procedures employing protective fluxes or operations conducted in the presence of non-oxidizing and non-reacting gases allow the production of sound cast forms of the metal. It is heavier than sodium and the alkali metals, but lighter than beryllium, magnesium, or aluminum. For equal cross sectional area, its electrical conductivity is exceeded only by silver, copper, gold, and aluminum, and for equal weight and length, is among the best available conductors.

It is more active chemically than barium or strontium. On a price basis, calcium is by far the cheapest of the alkaline earth metals, but is more expensive than sodium which is lower in atomic weight and cheaper in cents per pound. In organic syntheses, sodium is in a better competitive position. However, in metallurgical work, as a deoxidizing agent, reducing agent, degasifier, and alloying metal, the low melting point and high vapor pressure of sodium are disadvantages which eliminate it.

Calcium is produced by the electrolysis of fused calcium chloride.[4] Owing to hydrolysis and the formation of basic salts, pure anhydrous $CaCl_2$ can be prepared only with difficulty. In the presence of basic salts, calcium metal is attacked and dissolved by the electrolyte to the extent of 17 per cent. During electrolysis, if basic salts are allowed to form, the bath thickens, the conductivity decreases, and the calcium yield falls off. In commercial work the electrolyte must be completely changed at periodic intervals.

Pure calcium chloride melts at 780° C. and impure calcium metal at 800° C. The range of safe working temperatures is small, as the finely divided metal burns in air above 800° C. and easily forms metal fog in the electrolyte. The decomposition voltage of calcium chloride at 800° C. is given as 3.24 volts,[5] while the specific conductivity at the same temperature is 1.9.[6]

The commercial method for calcium production uses a vertical contact cathode upon which the calcium is deposited as the cathode is continuously moved upward. Very high cathode current densities are used, being of the order of 650 amp./sq. in. (100 amp./cm.^{2}). The electrolyte is pure calcium chloride kept at 780° to 800° C. The energy consumption is of the order of 50,000 kw-hr./ton, or 22 to 25 kw-hr./lb. Theoretically, 2.76 kg. of calcium chloride are needed per kg. of calcium. In actual practice this ratio is closer to 4 or 5 kg. of calcium chloride to one of metal. Low recovery values are chiefly due to the atomizing effect of the violent chlorine evolution. This causes a fine spray of electrolyte which is carried up the flue of the ventilating system. Other losses are due to the necessary skimming of the bath at intervals and to the layer of chloride formed on the calcium as it is drawn from the bath. Once in operation, the cathode is effectively one of calcium metal. Thin layers of calcium chloride protect the metal from the air. The commercial metal

Table 1. *Physical and Chemical Properties of Calcium.*

		Reference
Atomic weight	40.08	
Boiling point	1,170° C., 2,138° F.	
Compressibility constant, cubical		
At 30° C., 0 atm. pressure	$\beta = 5.885 \times 10^{-6}$	I. C. T. vol. 3, p. 46
At 30° C., 11,600 atm. pressure	$\beta = 5.300 \times 10^{-6}$	I. C. T. vol. 3, p 46
At 20° C., 99-493 atm. pressure	$\beta = 5.8 \times 10^{-6}$	I. C. T. vol. 3, p 46
	where $\beta = -\frac{1}{\text{vol.}_{\text{cm.}}} \times \frac{d\,V_{\text{cc.}}}{d\,P_{\text{atm.}}}$	
Electrical conductivity		
Equal cross-sectional area	Ag = 100, Ca = 45.1	
Equal weight and length	Ag = 32.5, Ca = 100	
Elongation	6%	I. C. T. vol. 2, p. 592
Hardness		
Von Moh mineralogical scale	2.5	
Brinell	17 (500 kg. load)	
Scleroscope	19-20	
Heat of vaporization	399 kilo joules/gram atom	I. C. T. vol. 1, p. 102
Magnetic susceptibility	1.10×10^{-6} cgsm at —170° to 18° C.	I. C. T. vol. 6, p. 354
Melting point	810° C., 1,490° F.	
Rapid oxidizing point	260° C., 500° F.	
Specific gravity	1.55	
Specific heat		
—185° to 20° C.	0.157	
0° to 100° C.	0.149	
Tensile strength	8,700 lb./sq. in.	
Thermal expansion	0.000025 cm./cm./deg. C.	I. C. T. vol. 1, p. 104
Vapor pressure		
At 731° C.	0.001 mm. Hg	I. C. T. vol. 3, p. 205
At 917° C.	1 mm. Hg	I. C. T. vol. 3, p. 205
At 1,170° C.	760 mm. Hg	I. C. T. vol. 3, p. 205

may contain small quantities of carbon, carbide, and alkali and alkaline earth metals.

Laboratory studies of calcium production have been made by a large number of workers.[7-13] Laboratory applications of calcium metal are well known. It burns brightly in oxygen, combines with sulfur, chlorine, nitrogen, and other materials, and reduces nearly all metallic oxides on heating. Calcium is used in freeing absolute alcohol from the last traces of water. The liquid is digested with calcium turnings, after which the alcohol is distilled. The application of calcium in producing high vacua is common knowledge. If the metal be heated in a tube connected with a vessel at low pressure, it takes up the last traces of air, forming oxides and nitrides, thereby reducing the pressure in the system to very low values.

Calcium does not react or take up argon. It is therefore employed for the separation of argon from nitrogen. When rapidly heated in CO_2, the metal is converted to lime and calcium carbide (CaC_2). The hydride CaH_2 is formed by passing hydrogen over heated calcium, and in a similar way the nitride Ca_3N_2 is produced by passing nitrogen over the metal. When heated in ammonia, calcium forms the hydride and nitrogen. When reacted with steam, the nitride gives off ammonia. Ammonia is absorbed by calcium in the cold with the formation of a compound $Ca(NH_3)_6$, an exothermic reaction. In the absence of air, this material is converted to $Ca(NH_2)_2$. Laboratory applications in which calcium is employed as a removal agent for small amounts of oxygen, moisture, and other substances with which it reacts readily, the calcium metal meanwhile being in a solid form, are well known.

Industrial applications and investigations have been quite numerous in recent years. An appreciable patent literature has been built up. The specific uses include the refining of lead; the preparation of lead alloys; the deoxidation of copper; the preparation of the copper-calcium alloys; the making of bearing bronzes of the high lead type; the use as a deoxidizer and refining agent in cast iron, nickel and its alloys, particularly iron-nickel and chromium-nickel; applications as an alloying, purifying, and modifying agent in aluminum, magnesium, and beryllium alloys; as a reducing agent in the preparation of chromium metal powder, thorium, and uranium; suggested uses in the desulfurization and refining of petroleum and related products; as well as the application in chemical syntheses and minor uses.

Calcium is an effective agent for the debismuthizing of lead to make it suitable for white lead manufacture. When metallic calcium is introduced into molten lead, calcium-bismuth drosses are formed. The bismuth content is reduced to less than 0.05 per cent. and the last traces of arsenic, antimony, silver, and copper are removed. Lead-calcium alloys containing approximately three per cent. calcium are, in a manner similar to the desilverization of lead bullion with zinc, stirred into the lead by a mixing machine. Other processes, such as cooling, blocking out, and reducing the bath close to the freezing point of lead, follow desilvering operations. Excess calcium remaining in the lead is removed by chlorination. Considerable development of the process has been carried on by the American Smelting and Refining Company.[14-16]

The age-hardening of lead-calcium alloys has been

the subject of a large amount of investigation. This system was studied in considerable detail by Caron,[17] Donski[18] and Baar.[19] The system is characterized by the presence of the compounds Pb_3Ca, PbCa, and $PbCa_2$. Only alloys in the range between pure lead and Pb_3Ca are at present of commercial interest.

Calcium-Lead Alloys

During the War the demand for shrapnel bullets caused a shortage of antimony and antimonial lead, and the lead-barium-calcium alloys known as Frary[20] or Ulco metal were developed. These hard alloys, containing up to two per cent. barium and one per cent. calcium, also found considerable favor for bearings. Investigators have studied the physical properties of lead alloys up to two per cent. calcium for use as bearing materials. In these, large particles of Pb_3Ca cause hardening and furnish bearing surfaces. "Bahnmetal," widely used as a lining for bearings on German railways, contains about 0.75 per cent. calcium with 0.5 per cent. sodium and 0.05 per cent. lithium.

Schumacher and Bouton[21] determined the existence of a definite range of age-hardening lead-calcium alloys. They state that some of these hardenable alloys possess properties which strongly recommend them for commercial uses. Compared with the one per cent. antimony-lead alloy, which is generally recognized as one of the best cable sheathing materials, the lead-calcium alloys develop greater fatigue resistance, tensile strength and hardness. These properties reach nearly constant values shortly after extrusion because of the rapid rate of precipitation of calcium from solid solution, and the slow rate of diffusion and agglomeration of calcium, or the molecule Pb_3Ca. The one per cent. antimony-lead alloy continues to change even after a period of years. Experiments on corrosion resistance show the lead-calcium alloys to be so little different from the one per cent. antimony-lead alloy as to have no appreciable effect on the life of a cable.

Townsend and Greenall[22] state that the 0.04 per cent. calcium-lead alloys show much higher endurance curves and greater fatigue resistance than the one per cent. antimonial lead.

Independent investigation by Dean and Ryjord[23] shows that the lead-calcium alloy containing 0.03 to 0.04 per cent. calcium and cooled from an extrusion temperature of 225° to 250° C. has a tensile strength of about 4,000 lb./sq. in. (280 kg./cm.^{2}), a dynamic strength of 1,200 to 1,500 lb./sq. in. (84 to 105 kg./cm.^{2}) as determined on the Moore machine at 1,700 r.p.m., and a static "fatigue" strength markedly superior to the one per cent. antimony alloy. These properties make this alloy a superior cable sheathing. 0.02 to 0.1 per cent. calcium in a calcium-lead alloy was suggested as sheathing material for electrical cables.[24-30]

Large scale field tests of lead-calcium alloys on commercial telephone and cable lines have been conducted since 1930. They will serve as final criteria of the commercial usefulness of the alloys. The manufacture of cable sheaths for electrical lines requires so much lead that it is ranked as one of the three major consuming industries. It is interesting to note that if all cable sheath in the United States—an industry which consumes from one-fifth to one-quarter million tons of lead a year—were made of the 0.04 per cent. calcium alloy, one hundred tons of calcium would be needed annually for this use alone.

Very small amounts of calcium appreciably increase the deformation pressure of a high purity lead.[31]

As far back as 1907, Pratt[32] claimed the use of calcium for deoxidation and degasification of copper. Within recent years studies of this effect have been intensely pursued. Masing[33] has described the use of calcium in producing deoxidized copper castings of high conductivity. This work was carried forward in the research laboratories of the General Electric Company and the Bell Telephone system, by Schumacher, Ellis, and Eckel in a series of papers,[34] Zickrick,[35] Wyman,[36] as well as many others who have not published their work. Schumacher and his co-workers concluded that small additions of calcium in copper effectively deoxidize the metal without materially impairing the mechanical properties and electrical conductivity, provided the residual calcium is kept to a small percentage. The resulting deoxidized copper is not embrittled by annealing and reducing gases.

The solubility of calcium in copper is slight, according to the equilibrium diagram of the copper-calcium system by Baar.[37] Zickrick, in his study of the conductivity of copper castings,[38] concluded that for copper castings the best deoxidizers in reference to their effect on conductivity were calcium, calcium boride, or boron carbide. The calcium was introduced in the form of a copper-calcium alloy.

Considerable interest was shown and experimental work carried on in connection with over-deoxidized copper whch, instead of having little or no residual calcium remaining in the final product, carried a slight excess of calcium to protect the metal and maintain it in a deoxidized condition during further working and fabrication.

Calcium has been shown to be a preferred deoxidizer to other metals of the alkaline and alkaline earth series. Small amounts of calcium give superior qualities to copper as regards resistance to embrittlement. High-calcium copper alloys are satisfactory deoxidizers. Calcium is preferred to silicon as a deoxidizer for copper, in that it affects the conductivity very little, while silicon affects it markedly.

High-calcium copper alloys are now commercially available. They can be produced in brittle forms which are readily powdered or ground. Their manufacture involves the melting of copper and the addition of calcium to the melted copper. Calcium has a lower melting point than copper, and when added to the molten metal readily melts and alloys.

Calcium is an excellent deoxidizer for high strength tin-copper bronzes. It serves as an effective reagent suppressing lead segregation in the case of the high leaded bearing bronzes which are tin-free and have lead contents of the order of 30 to 50 per cent. with copper 70 to 50 per cent.[39]

Copper and lead do not alloy. In copper-lead mixtures, lead segregation takes place very rapidly and is excessive in alloys containing 30 per cent. or more lead. These mixtures are very useful for bearings necessary for engines operating at high speeds and high lubricating oil temperatures, at operating conditions under which the Babbitt, tin-lead, or related bearing metals fail. Without the use of lead segregation suppressors, manufacturing practice of the copper-lead materials is very difficult and unsatisfactory.

Calcium has been suggested as an alloying constituent for bearing metals having compositions of the order of 62 to 46 per cent. Cu, Sn 4 to 8, Zn 3 to 10, Pb 30 to 35, Ca 0.2 to 0.5, and Na 0.1 to 3 per cent.[40]

Calcium in Ferrous Metallurgy

Metallic calcium in the form of briquettes made with sponge iron has been used as a deoxidizing agent to the extent of 0.5 per cent. calcium for iron castings made in green sand molds.[41] Calcium-treated iron tends to be denser and more uniform in grain structure than ordinary cast iron and to have increased transverse and tensile strength and better impact values (resistance to shock). Further work developed the use of calcium metal alone, additions of which to molten cast iron allowed the regulation of the amount of carbon in graphitic form, causing increase in the strength of the casting and control of the graphitization of the carbon.[42] Comparative values for ordinary cast iron and calcium treated cast iron as well as heat-treated cast iron show definite advantages due to calcium additions.[43]

Good results have been obtained with steel, the calcium functioning as an effective deoxidizer and degasifier, thus producing cleaner steels. It has the advantage over other deoxidizers that practically none of the reagent is left in the metal. Improved characteristics of the steel are shown in higher yield points and greater tensile strength.

Methods had to be developed for introducing the calcium metal into the steel. Briquetting with sponge iron or steel chips gave only partial success. Mechanisms[44] were finally developed by means of which slugs or pieces of calcium were shot into the ladle of molten metal through an air pressure gun. Sufficient force can thus be applied to the calcium projectile to shoot it deep into the metal where it reacts, disintegrates, does its deoxidizing, and is converted into lime which rapidly rises to the slag.

Originally, projectiles of specific shape were employed, but later modifications of the gun use irregular chunks of calcium weighing about 2 oz. (57 g.) each. At the present time slugs can be shot at the rate of 120 to 150 per minute when the gun is hand operated, or 200 to 300 per minute if it is motor driven, and a 60-ton ladle of steel deoxidized in a period of approximately 5 minutes when 2 lb. (0.907 kg.) of calcium per ton of steel is used.

The price of calcium, which some 15 years ago was still in the neighborhood of $20 per pound, is now less than $1.50. This price represents metal 98.5 to 99 per cent. pure and is furnished in irregular lumps (5 to 10 cm.) packed in 100-pound (45 kg.) tin-lined cases or 10-pound (4.5 kg.) tin cans. It is also offered in 2-ounce (57 g.) pellets, in shavings of various degrees of fineness, and in sticks or extruded wire, all of which carry appropriate extras. Specially purified metal, of course, likewise commands a premium and higher prices are charged for small lots.

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Gum Inhibitors for Gasoline and Benzol

By R. C. Bickmore

INHIBITORS, or antioxidants, are used in small quantities to prevent or delay the initial oxidation of the unsaturated hydrocarbons present in benzol[1] or gasoline. These unsaturated hydrocarbons would otherwise, by oxidation, form unstable peroxides,[2] and through polymerization or by combination with other bodies in the fuel, lead finally to gum formation, a phenomenon especially undesirable in fuels for internal combustion engines.

Without the inhibition of resinification, the high anti-knock value of some of the unsaturated hydrocarbons present in certain cracked gasolines would decrease rapidly on storage.[3] The unsaturated hydrocarbons chiefly responsible for gum formation, in gasolines, are aliphatic and cyclic diolefines, mono- and diolefines, and diolefines attached to a C_6 ring.[4] High concentrations of certain mono-olefines might sometimes also cause it.[5]

Gum formation, then, is associated with oxygen absorption, which brings other disadvantages, for increased peroxide concentration means not only increased gum formation and decreased anti-knock value, but also color darkening and decreased susceptibility to inhibitor action.[5] (Low concentrations of peroxides may, however, be removed by Fuller's earth, other characteristics of the gasoline remaining unaffected.)

The delay in gum formation is termed the "induction period."[6] One method of using inhibitors is first to prolong the induction period prior to gum formation, by addition of one class of compounds, and subsequently to decrease the rate of gum formation, once started, by addition of another class of compounds. This is alluded to later.

Substances which are themselves easily oxidizable form the most effective inhibitors, phenols and aminophenols being suitable in this respect. A fairly comprehensive list of inhibitors would include mono-, di-, and tri-hydric phenols, amino compounds, aminophenols, nitro-compounds and pyridine. The isomeric cresols, or a mixture of these ("tricresol") have been found to comply with the requirements for good inhibiting properties. (Impure cresylic acid should not be used.)

The desiderata of an inhibitor are:—

(1) Capability to prevent or reduce resin formation.

(2) Its evaporation residue must be nil (or very small). (Of itself or in reaction with the fuel.)

(3) Must have no detrimental effect upon the normal combustion of the fuel and produce no unpleasant combustion products.

(4) Must have little or no effect upon the engine parts with which it is likely to come into contact.

(5) (Less important owing to small quantity used)—Low cost, high solubility in the spirit, and suitable volatility related to the volatility of the spirit.

It is understood that the choice of the inhibitor, and the concentration at which it is to be used, will depend upon many factors, notably upon the type of spirit itself and the nature of the inhibitor; there are different inhibitors suitable for benzol produced by high- and low-temperature carbonization processes, and for cracked gasoline, etc.

The addition of small amounts of inhibitor to a spirit produces a decreasing tendency to gum until a minimum is reached, when the tendency increases somewhat. For the smallest quantity of gum, using a benzol spirit, p-methylaminophenol and p-phenylenediamine, the concentration is about 0.001% by weight, whereas with o- and p-cresols the corresponding concentration is about 0.05% by weight. The optimum concentration of benzylaminophenol is about 0.001% by weight with benzols and about 0.005% by weight with low temperature spirits.

In general, 0.05% of a mixture of the cresol fractions prepared from pure cresylic acid (containing at least 50% of the ortho and para isomerides) is suitable for stabilizing high-temperature-process benzols, and forms a cheap, soluble, and sufficiently volatile inhibitor.

For low-temperature benzols, less than 0.01% of pyrogallol, α-naphthol, p-methylaminophenol, p-benzylaminophenol can be used.

For gasoline, benzylaminophenols are used, as the phenols and aminophenols are not soluble in gasoline to the extent that they are in benzols, hence are not so suitable. Some of the more recent work on inhibitors is here given.

Rogers and Voorhees,[7] in noting the correlation of the chemical nature of antioxidants with their effect in inhibiting gum formation, and stating that the readily oxidizable mono-substituted p-aminophenols are particularly effective, remark that p-benzylaminophenol, which is twice as soluble in gasoline as in water and quite color-stable, generally produces an increase in color stability of gasoline, and possesses marked advantages over such compounds as α-naphthol and polyphenols previously proposed as inhibitors.

The Gulf Refining Company has a British Patent,[8] relating to the manufacture of gum-inhibited motor fuels, in which the inhibiting agent comprises the benzene solution produced from the compound made by oxidizing α-naphthol with an aqueous solution of a ferric salt, or dehydrating 1:8 dinaphthol under conditions preventing oxidation. For the stabilization, and prevention of deterioration in storage, of cracked anti-knock petrol Egloff has used anthraquinone.[9]

Egloff, Morrell, Lowry and Dryer in their work on inhibitors for cracked gasoline, especially concerning the relation of structure to inhibiting effectiveness, found that an increase in concentration up to 0.05% of pyrocatechol increases the induction period proportionally.[10]

"Copper-Dish" Test

Some inhibitors reduce the gum given in the analytical "copper-dish" test. Phenols and aromatic amines, they found, are pronounced inhibitors, but a single OH or NH_2 group has little action. Most inhibitors contain one of the following groupings: more than one OH or NH_2 group, an aromatic OH or NH_2 group, a single aromatic OH or NH_2 group with one or more alkyl groups, an aromatic secondary NH group. Modifying groups in phenols and amines are more effective in the ortho and para than in the meta position.

Ethers, NO_2-halogeno-, and sulfur compounds are effective only when they contain an aromatic NH_2 or OH group. The hydrocarbons examined and $PbEt_4$ are ineffective. Fe $(CO)_5$ increases the rate of deterioration.

It is interesting to note with regard to the use of catechol, that Hyman and Ayers have a patent,[11] in which it is stated that gum formation in motor spirit is inhibited by the addition of ammonia, or its organic substitution products, and pyrocatechol. This substance has recently come into extensive use as an inhibitor. The inhibitor is made of a solution of the dihydroxybenzine (10%) in cresol. To the refined benzol .01% of the mixture is added.

The Anglo Persian Oil Co. has a British specification[12] using 0.005-1% by weight of di- or tri-hydric phenol (catechol, hydroquinone, or pyrogallol) as a solution in cresol. A 5-15% solution of the dihydric or trihydric phenol in the cresol may be employed. The fuel may first be distilled into a light and fraction which are separately refined by known methods, the gum stabilizing agent being added to the light fraction and the fractions being mixed together.

For the inhibition of gum formation in low boiling hydrocarbon oils, the Standard Oil Development Company[13] has used a mixture of a colorless inhibitor and an inhibitor which is a dye, the amount of the latter being insufficient alone to prevent gum formation. Examples are indophenol from nitrosodimethylaniline and α-naphthol, with NH.PhMe: indophenol from nitrosophenol and $NH.Ph_2$, with tricresol.

Recently Introduced I. G. Process

Recently a method has been introduced,[14] by the I. G. for the removal of substances, forming resins, from benzenes which are to be employed as automobile fuels. The benzene is subjected to the action of a polymerizing agent, *e.g.*, sulfuric acid or aluminum chloride, under conditions milder than are necessary for the complete polymerization of the gum-forming substances and also subsequently under non-oxidizing conditions to the action of silent discharge at substantially room temperatures. The benzene is then separated from the polymerides by distillation.

In their study on inhibitors for cracked gasoline, Lowry, Egloff, Morrell, and Dryer[15] state that a correlation is observed between the effectiveness of gasoline inhibitors, as measuredly an accelerated oxidation test, and their critical oxidation potential. The best inhibitors have potentials betweeen 0.60 and 0.80 volt, fair inhibitors are in the range 0.800-1.043 volt, while practically no inhibiting action is shown by compounds with higher potentials. Quinol and certain ethers show an inhibiting action less than would be expected from their potentials; this is attributed to their tendency to undergo direct oxidation.

Some attempts have been made to localize and isolate for inhibition, the portions of the distillates of automobile benzols which have the greatest tendency to form gum. The work of Pieters and Visser has a direct bearing on this.[16] The tendency of a motor benzol to form gum, as shown by the gum produced on refluxing the benzol in a current of oxygen, is greatest in the fractions boiling below 86° and above 116° and is negligible in the large intermediate fraction, although the latter still contains valuable unsaturated hydrocarbons, and has in consequence a high anti-knock value.

An instance in which gum inhibitors for cracked petroleum distillates are formed *in situ* is supplied by the Standard Oil Company's method,[17] where an in-

teraction takes place between an added halogenated hydrocarbon (ethylene bromide, chlorinated petroleum fractions) and aminating agents (ammonia, sodamide). Burk[18] (Standard Oil Company) has also a method of adding 0.0004-1% of a reagent selected from the group consisting of semi-carbazide derivatives thereof, in which the substituent radicals are in the δ position, *e.g.*, the δδ-Ph_2 compound and hydrazines containing an aromatic radical except mononaphthyl, *e.g.*, $NPh_2.NH_2$.

Separate Materials for Prolonging Induction

Allusion was made, earlier, to the use of separate materials in prolonging the induction period and reducing the rate of gum formation thereafter. Such a preparation is outlined in the specification of the Gulf Refining Company[19] for gum-inhibited motor fuel in which substances such as α-naphthol, or quinol-ammonia, benzidine, etc., are used in the first stage, and amyl alcohol, or xylidine etc., are used in the second stage. Together the reagents must not exceed 0.01%.

The Texas Company,[20] to inhibit motor fuel, utilizes substances capable of oxidation to give anti-oxidants. These are added to the fuel and oxidized *in situ* either by an added oxidizing agent or by the peroxides generated by storage in air. The preferred agent is a mixture of a quinone (orquinol) with p-$C_6H_4(NH_2)_2$ and its derivatives; on oxidation an indophenol is formed.

Cracked motor fuels can be stabilized, according to the Selden Company's patent,[21] by addition of not less than 1% of cyclic imidines or hydroxyimidines (*e.g.*, succin-phthal-, or naphthal-imidines, their OH-derivatives, or homologs) and if desired, a base, (NH_2PH, or $C_6H_4Me.NH_2$). In another[22] patent by the same company, phthalide and its derivatives (less than 1%) are claimed and may be used in conjunction with an amyl-amine and a perylene vat-dye (perylenetetracarboxyldimide).

For the treatment of light petroleum distillates against color deterioration and gum formation the Socony Vacuum Corporation[23] retards these tendencies by the use of not more than 0.01% of nicotine and thiocarbanilide.

Wikner and Richardson; using a mixed inhibitor (0.03% cresol + 0.005% α-naphthol) obtained a reduction in gum test of 98.8%, on a gas-works benzol.[24]

Addition of Inhibitor to Benzols

The crude fuel must first be rendered suitable for inhibition by removing those impurities either promoting or tending to inhibit resinification, acidic or alkaline in character, by washing with dilute alkali and dilute acid, (B. P, 289,347, 1926). Small quantities of phenols, capable of inhibiting resinification are better for complete removal (B. P. 289,347, 1926), since in this case the necessary quantity of inhibitor can be calculated.

Unless pyridine bases and polyhydric phenols, native to the benzol, are removed, or if an excess of inhibitor, *e.g.*, pyrogallol, has been used, in presence of pyridine bases in the benzol, color deterioration may take place on storage, causing the spirit to show a yellow coloration in the bowls of visible pumps, etc. If this color stability is not attainable, pyridine bases should be removed with 3 to 5% suitable strength sulfuric acid (25 to 40%) and the preliminary alkali wash for phenols should be increased.

The method of incorporation of the inhibitor with the benzol is to add about one-quarter of the estimated amount of inhibitor at the final fractionation directly the automobile-benzol fraction has begun to come over, otherwise contact with atmospheric oxygen will promote resinification. Water is removed from the storage tank after completion of distillation. Further inhibitor is then added to bring the concentration of inhibitor to correct value.

Preliminary Tests on Crude Spirit

Preliminary laboratory tests can be made on the crude spirit, freed from any wash oil, to determine its behavior to inhibitors. The inhibiting effect of the phenols present can be seen by comparing a sample (prepared to pass a specification for distillation range, but not washed) with a sample washed to remove phenols and pyridine bases, (using 10% caustic soda, water, and 30% sulfuric acid) and distilled to the same temperature as the first sample. The stability obtained by using a certain amount of a suitable inhibitor can be seen by adding say 0.03% by weight of the inhibitor to the phenol- and pyridine-free distillate obtained from the second sample.

The three samples are submitted to oxidation tests for storage stability. Should the third sample show more than 5 mg. gum per 100 ccs on oxidation test, the inhibitor must be increased or other inhibitors investigated for their suitability.

Assuming that an inhibitor comprising catechol dissolved in specially prepared "tricresol"—consisting chiefly of o- and p-cresols—is to be used, the following procedure would be undertaken.

A supply of the mixed inhibitor is made by dissolving the solid catechol, with heat, in the cresols, in the proportion of 1 lb. of catechol to one gallon of the cresols. A week's supply, assuming that the mixed inhibitor is to be added at the rate of .015% by weight of the benzol treated, and that the benzol produced per week is ten thousand gallons, would be 1.2 gallons (taking a figure of 0.860 for the specific gravity of the benzol). The inhibitor is now uniformly added to the finally fractionated spirit in the proper proportion, allowing 46 ccs. for every 100 gallons of benzol. The gradual even addition can be attained by use of a tap funnel delivering this quantity as the benzol is running in.

Costs (Inhibition Only)

Materials: Specially prepared "tricresol" mixture say 8c per gallon. Catechol say $1.90 per lb.

1.2 gallons mixture will contain 1.2 lbs. catechol.

Week's supply:

1.2 lbs. catechol @ $1.90 per lb. =	$2.28
1.2 gallons cresol @ 8c per lb =	0.96
	$3.24

Equivalent to over 3,000 gallons of benzol treated for $1.00.

This cresol-catechol mixture may with safety be used in strengths down to 0.010%, when in cost it is no dearer than when using 0.03% of cresol only. This inhibitor has especial advantages over the plain cresol inhibitor in cases where, despite the use of the latter, oxidation test results are high, and when color has developed on storage (*i.e.*, the cresol-catechol inhibitor reduces gum formation and produces color stability).[25] In addition the mixed inhibitor may be used in much lower concentration (about one-fifth the strength) so that, although catechol is relatively more expensive, the cost of the new inhibitor is no greater than that of the cresol inhibitor.

Advantages of Inhibition

Certain benzols, hitherto refined for the market by the concentrated sulfuric acid washing process, are capable of very satisfactory treatment by less drastic acid and alkali washes for removal of pyridine bases and phenols respectively, with addition of inhibitor after redistillation. Crude benzols of low final boiling point, having readily removable low boiling acidic phenols will require less drastic washing with caustic soda than benzols of high boiling difficultly-removable tar acids.

Inhibition results in the conservation of unsaturated hydrocarbons of considerable fuel value, and often of high anti-knock value, besides reducing refining costs per gallon of pure spirit through economies in consumption of sulfuric acid and caustic soda. Wikner and Richardson obtained an increased yield of motor benzol (5%) and reduction in cost of acid of 80%.[26]

Sulfonation of valuable aromatic hydrocarbons and production of troublesome acid tar are at a minimum. Weak used acid can be more easily recovered. Existing plant, if clean, can be used, and less corrosion of plant will ultimately result.

Certain sulfur bodies (*e.g.*, thiophene) however, require that the acid washing process be not too restricted. Consequently a restricted wash (with say 1-2% by volume of 80% strength sulfuric acid) of a fraction known to contain the sulfur bodies in a localized form is used, thus helping to conserve the valuable hydrocarbons, and improving the color and odor of the spirit. The efficiency of removal of the thiophene depends to a great extent upon the strength of the sulfuric acid, 82% strength appearing to be the most favorable.

B. P. 289,347, 26.10.26, covers the addition of small proportions of aromatic hydroxy-nitro or amino-compounds: the inhibitors being cresols, aniline, etc., and mentions that due allowance must be made for the phenolic and other substances already present in the fuel, the time during which the fuel is to be stored, etc.; the inclusion and adjustment of the phenols already present in the benzol, and alternatively their removal, with addition of the requisite amount of the inhibitor, are both methods provided for in the specification.

An alternative process for selective removal of the undesirable gum-formers from the total unsaturated hydrocarbons, with elimination of corrosive sulfur compounds, is the silica-gel refining process,[27] (Silica Gel Corp.) as used by the Rochester Gas and Electric Company and The Bethlehem Steel Company, (a very large producer of motor benzol) since 1929.

Crude light oil is slightly acidified with, *e.g.*, sulfuric acid (as starter) (from .2 to .4% by weight) and forced through silica gel (the carrier) at approximately 275° F., under pressure sufficient to maintain in liquid phase. Once the gum (the catalyst) is formed, by polymerization of the unstable unsaturates, (diolefines), more accumulates until the numerous pores of the gel are completely sealed, when the gel can be removed and reconditioned, and a fresh charge of gel is fed to the system. The desirable unsaturates are not destroyed.

In the case of motor benzol, a 10% average increase, in salable product per gallon of crude treated, is claimed.

The Rochester Company quoted (1928) a reduction of approximately 80% in sulfuric acid and caustic soda consumption, in the purification of by-product light oils for 'Bengas' manufacture, and an increase in the yield of salable motor fuel of approximately 12 to 15%.

It is stated that 1 lb. of gel is sufficient to treat about 150 gallons of benzol, before gel reactivation is necessary, and that the process gives a yield of 85% instead of 72% from 65's crude benzol by the usual once-running and acid washing process; and when a benzol approximately equal to once-run is obtained direct from the stripping still of the recovery plant, instead of a yield of 85% by the acid-washing process, a yield of 93% of the once-run benzol is obtained.

Although the equipment is more expensive than that employed for the acid-washing process, this extra cost is said to be rapidly amortized by the revenue from the increased yield of refined motor benzol.

Other methods are available for the refining of benzol by the selective removal of unsaturated hydrocarbons, such as selective refining by sulfuric acid, the "Instill" Process,[28] the use of chlorine,[29] hydrochloric acid, and metallic chlorides, oxidation methods, the use of adsorbent materials, etc., but, as we have seen, the

inhibiting processes have the advantage that they require no special plant, they effect numerous economies in washing materials, give increased yields of motor fuel, (10% or more) and the inhibitor cost itself is remarkably small considering that a satisfactory gum-stable motor fuel, suitable for storage, results from its use, which when tested practically on a fleet of cars is generally as good if not better than benzol refined in other ways.

The total costs of refining in inhibition processes, including any weak sulfuric acid and caustic soda and the inhibitor cost with of course labor and steam costs, will, when deducted from the returns for the inhibited benzol sales, give an increased balance over the corresponding profit obtained in the acid-washing process, owing to the comparatively low process costs (as against a large expenditure on concentrated sulfuric acid) and owing to the higher value, due to increased gallonage, of the motor-benzol produced. The increased profit so produced may amount to 1c or more per gallon.

Costs: (Inhibitor process compared with the old acid washing process) 10,000 gallons of a "once run" typical benzol from coal carbonization which gave formerly 7,855 gallons of automobile benzol up to specification, and showed 1,063 gallons in washing losses, using concentrated sulfuric acid (3%) and 10% strength caustic soda (2½%), now gives 8,695 gallons of automobile benzol passing the same specification, and shows 101 gallons in washing losses, using 25% strength sulfuric acid (3%) and 10% strength caustic soda (6%).

The increased revenue, including increased production of naphtha, etc., is approximately $200. The decreased costs of treatment, though including the inhibitor, are approximately $25. Hence a total profit of $225 on a basis of 10,000 gallons crude benzol results, representing a total profit of approximately 2.3c per gallon.

It must be emphasized, that, while, thanks to Hoffert's valuable discovery, gum stability can be ensured on an industrial scale, inhibition can be more simply and cheaply applied to the large class of benzols produced, from which pyridine bases and phenols are almost absent. It is also suitable for benzols of low or moderate sulfur content, but thiophene necessitates the employment of concentrated sulfuric acid. The present problem is therefore to find an efficient remover for thiophene, but one which will not attack to any extent the unsaturated hydrocarbons.

In the case of variation in the composition of the benzol requiring treatment due to *e.g.*, fluctuating carbonizing conditions, all that is required is the necessary experimental work for determining the proper treatment, taking care that when the maximum concentration of unsaturated hydrocarbons is present, suitably increased washing with concentrated sulfuric acid is given, and more strict attention paid to distillation.

The concentrated sulfuric acid washing process was a method used, until quite recently, almost always for refining crude benzol for motor fuel, and employed sulfuric acid of strength from 87 to 95%, (or 64-66° Bé). This strength of acid removed nearly all the unsaturated hydrocarbons, partly by polymerization and partly by solution in the acid. Further washes with concentrated acid removed thiophene and thiotolene. The quantity used varied considerably with the fuels carbonized and the conditions of the benzol recovery and rectification. Pyridine bases, etc. disappeared early in the process.

This old concentrated acid process, although uneconomical, had some advantages, and the process at these points needs alternative treatment. Sulfuretted hydrogen was oxidized by the sulfuric acid, but under the new conditions, by using more care and thoroughness on the alkali wash, it can be removed, or kept at a minimum.

Although a benzol cannot be condemned because it is "off-color," and although a good "water-white" appearance is no criterion of purity,[30] at the same time, to be acceptable, a high-class motor fuel must remain water-white on storage in the dark, and should also be capable of remaining water-white for several hours, at least in sunlight.

Benzol refined by concentrated acid passed the above quality standards. Only through carelessness or by stilting of the acid was trouble found. On the other hand, a well-fractionated, alkali-washed benzol is often bright yellow in color, especially in the fraction distilling above 100° C.

Some color-removing treatment is therefore necessary, as before-mentioned. The small amount of sulfuric acid of about 60° to 62° Bé is a simple alternative to the use of silica-gel, decolorizing carbon, bauxite, Fuller's earth, and mixed adsorbents.[31]

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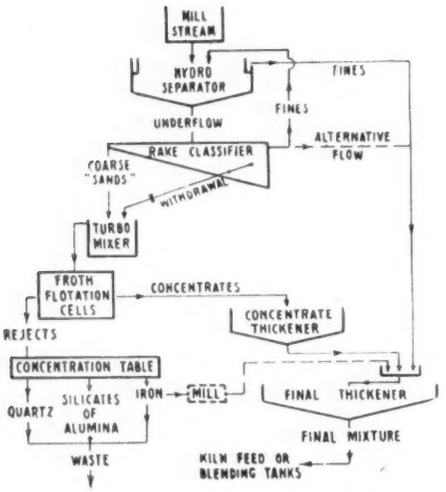

Flow sheet of flotation plant of Valley Forge Cement Co.

Chemical Control Conquers Cement

New Flotation Process Highly Suggestive of Better Raw Material Control in Many Chemical Operations

MAKING cement has always been a rule of thumb operation. Cement manufacturers knew better than they could practice, and since the results insofar as the use of cement went, being reasonably satisfactory, catch-as-catch-can raw materials have been tolerated. Not that the disadvantages and the extra costs have not been recognized; but the problem of establishing control was complicated and no method—reasonable either from the technical or the economic point of view—seemed worth the candle.

Economically the problem has certain resemblances to the mining and preparation of phosphate rock, and the solution recently found in a cement plant is of suggestive interest to chemical operators who start with such raw materials as limestone, fluorspar, pyrites, bauxite, and the various natural silicates.

In the case of cement the various specific elements in this problem have arisen out of uncontrollable variations in the chemical composition of the raw materials. Such variations not only have direct bearing upon the quality of the raw material produced; but they are directly reflected in plant costs of the heat necessary to produce the clinker and the grindability of the clinker produced.

The secret of cement quality lies in the proper ratio of lime to the other numeral constituents, silica, alumina, iron, etc. Chemical analysis plus performance test has established several practical standards, and the cement manufacturer has, of necessity, been content to seek out a happy combination of these materials in his raw rock. In some instances, there has been some modification of the raw material by adding more limestone, or materials rich in silica or alumina, but it has all been hit-or-miss, since even the modifying constituents have varied from batch to batch just as has the basic material. With such consistent variation in all proportions of every chemical constituent in all deposits of raw material, anything like real chemical control by mixing seemed indeed chimerical.

Without this control, uniformity of quality in the product was possible only within a rather lenient range, and though it was more difficult to burn and hard to grind, there was but the slimmest chance of effecting savings in heating and grinding costs. Many chemical plant operators will note sadly a curious similarity in these hard conditions to some of their own pet troubles.

Starting from the sensible point of view that all of these problems spring from natural and inevitable variations in the raw material, C. H. Breerwood, vice president of the Valley Forge Cement Company, sought to find the answer in some simple, practical, cheap method of controlling the chemical composition of these erratic raw materials. He found it after several years concentrated research. In principle, his idea seems childishly simple. It is to separate the various constituents of the raw materials by a flotation process. They may be recombined by mixing in any desired proportions.

Nathan C. Rockwood, editor of *Rock Products*, in collaboration with Mr. Breerwood, has recently published a complete description of the new process, from which the following is abstracted:

Before describing the new equipment and its functions in detail, a brief review will be made of the reasons why the installation was made. Although the Valley Forge Cement Co. has never found it necessary to purchase limestone for the correction of its raw material composition, probably the most important accomplishment from a commercial point of view is that its rock deposit is now substantially inexhaustible. In other words, the new process has added at least 150,000,000 bbl. of mix to that already available for blending in conventional practice, with the result that it will never be necessary to import limestone.

Secondly, quarry costs have been radically decreased, as the rock may be quarried without care in selection, and blending prior to grinding is unnecessary. This will be referred to in further detail, but

one of the most interesting features of this development is that regardless of the variation in the calcium carbonate value of the rock as received for treatment, the final product of the separation plant is held exactly at the desired composition without correction.

Third, there has been a very material gain in early and ultimate strengths of the cement, as was anticipated in view of the elimination of all quartz grains coarser than 325-mesh fineness, and the correction of the silica, iron-alumina ratio. In this connection it may be mentioned that the clinker is obviously of very high quality and thoroughly burned, the weight having increased about 16 lb. per cubic foot.

Fourth, any known type of cement can now be made at will by controlling the recombination of the constituents segregated in the separation plant. Thus, the available materials can serve as the source for "low alumina," "high silica," "alkali resisting" and other types of cement.

Fifth, and probably of the greatest importance, is the fact that the mill savings resulting from the use of the new process more than offset its cost, and these savings are in addition to the savings in the quarry itself. The three major mill savings are, decreased raw and clinker grinding costs, and lower fuel consumption. For example, rock ranging from 68% to 75% calcium carbonate is ground to approximately 85% passing a 200-mesh sieve. As the excesses of silica and alumina are removed deliberately from the coarser products of the tube mill, the kiln feed ranges from 90% to 92% passing a 200-mesh sieve. Although the clinker is obviously better burned and appears harder there has been a saving of approximately 10% in fuel. The elimination of the uncombined quartz from the clinker has resulted in a saving of approximately 10% in grinding costs.

Before referring to the actual flow diagram practiced at the Valley Forge plant, it should be pointed out that if desired, all of the tube mill products can be subjected to froth flotation to effect the separation between the calcium carbonate and the argillaceous compounds. Ordinarily, however, this is not necessary or desirable as quantities of the fine constituents are essential to the final composition in substantially all cases. Accordingly, it is the practice at the Valley Forge plant to treat a variable quantity of the coarser particles separated from the mill stream, the quantity so treated varying inversely as the calcium carbonate varies in the stone as received. This makes it possible to remove the excess silica and alumina in a single operation, but as the silica is the constituent requiring the primary control, the separation of the original material into coarse and fine parts is based upon the excessive silica content of the raw material in this case. The following table will make this clear. This table is based upon the treatment of rock ranging from 68% to 75% calcium carbonate, ground to an average fineness of 85% passing a 200-mesh sieve, the treated quantities being that necessary to provide a final mixture of 75.8% calcium carbonate. The treated tonnage is based upon the present curtailed capacity of 700 tons a day.

$CaCO_3$ in Rock	Percentage untreated	Percentage to be treated	Tons to be treated
68	46.5	53.5	374
69	49.0	51.0	356
70	52.7	47.3	331
71	56.6	43.4	304
72	60.2	39.8	272
73	65.7	34.3	239
74	71.0	29.0	203
75	77.3	22.7	159

Since the new separation plant was started it has been the practice to make the complete composition correction in the final thickener, but it has been intended to employ the slurry correction tanks when the rock received from the quarry will make it more economical or convenient to control the treatment to produce mixtures above or below ultimate composition.

Process Control

Referring to the flow diagram, it will be seen that the tube-mill slurry is delivered to a hydro-separator after sufficient water has been added to result in a dilution to approximately 20% dry solids. The hydro-separator serves as a 325-mesh sieve, the fines overflowing and being delivered directly to the final 80-ft. thickener. To complete recovery of the fines, the underflow is pumped to a rake classifier where the final separation and control of the treated and untreated parts is accomplished.

At the degree of fineness above described, the sands do not represent a sufficient tonnage for treatment to remove the excess silica. These sands, however, do include the uncombinable sizes, which may be arbitrarily stated as coarser than 325-mesh. They are allowed to precipitate, and are recovered by the rake elements and delivered to a blunger or turbo-mixer. The necessary additional tonnage required for treatment is admitted through a perforated bleeder pipe extending across the rake box above the rake elements. This bleeder pipe serves as the control of tonnage, and actually the final analysis of materials combined in the thickener. The particles withdrawn by the bleeder are the coarser of the minus 325-mesh products, and the finer particles are allowed to overflow and are combined with the fines classified in the hydro-separator. To make the separation more accurate, the overflow from the rake classifier is returned to the hydro-separator, where it overflows to the thickener.

The collecting reagent, oleic acid, is added to the pulp discharged from the turbo-mixer, which is then fed to a group of four flotation cells. In these cells, known as the "rougher cells," the frothing agent, cresylic acid, is added, which, together with the aeration causes the calcium carbonate particles to be segregated from the argillaceous compounds and recovered with the froth. The underflow from these cells contains lime values, and is further treated in a series of three "cleaner cells." The froth discharged

from these cells is of lower quality than that of the rougher cells, and it is likewise treated in a series of two "recleaner cells," the froth of which is combined with that of the rougher cells to form the final lime concentrate. This concentrate is delivered to a 27-ft. thickener. The underflow from the recleaner cells circulates through the three cleaner cells with the underflow from the rougher cells, the underflow of the last cleaner cell being the rejects or tailings of the plant.

In order to obtain capacity with economy, no attempt is made to obtain an absolutely pure concentrate, one of 87% calcium carbonate value being the most economical and convenient for the materials available at the plant. This concentrate is separately thickened, in order that the reagent water can be used continuously in circulation throughout the system to economize in reagents, and to effect a further economy in that the water is soft, as the calcium salts have been precipitated as calcium oleate. The underflow from this thickener is pumped by a Dorrco pump to a junction box, where this stream is continuously combined with the overflow from the hydro-separator, the two streams being de-watered to normal slurry moisture content in the 80-ft. thickener.

Although the tailings from the flotation cells do not now involve an uneconomical waste of any desirable constituents, it is the intention to install a wet concentration table for the purpose of recovering the iron values, principally sulphide, and to make the quartz suitable for sale as a by-product.

It has been found that quartz, silicates of alumina and iron are readily separable from these tailings by concentration, but the table is ineffective to make a separation between calcium carbonate and the argillaceous compounds. The proposed table is shown in the flow diagram. The iron values will either be returned to the tube mills for further reduction, or they will be ground separately in a small mill and added to the products entering the junction box of the thickener.

It has been found that the greatest total economy is particularly influenced by the degree of grinding of a specific argillaceous limestone. As carried out at the Valley Forge plant this means that the first consideration is to release the physical bonds between each of the constituents and to an extent that the final product will be of a desired ultimate fineness after the coarse particles of quartz and mica have been eliminated. Thereby, the concentrate can be held at a desired purity and the losses of calcium values in the rejects are negligible.

Since the separation plant was started in March of this year, the materials treated have ranged from 68 to 75% calcium carbonate. Regardless of this variation, however, the underflow from the 80-ft. thickener has been held to composition continuously, the error being so slight that blending has been entirely unnecessary. Due to the controls described above, the routine chemistry is actually simpler than that required in ordinary practice. The table shows just what happens to a specific material.

This table was based upon the treatment of 700 tons a day, which is the amount of stone required with the present curtailed capacity of the plant. This specimen is an excellent one to illustrate the reduction in silica that can be made with the above procedure. The alumina value, while not high, has been reduced, and it will be seen that by controlling the division of the treated and untreated parts prior to the delivery to the flotation cells, a radical elimination of alumina can be made, if desired, as it will be seen that the alumina value of the concentrate is 1.71%, whereas the original value was 5.34%. The increase in fines from 72.5% to 77% minus 325-mesh will be seen in the last line. It is believed that the total loss of 9 tons out of the original 505.4 tons of calcium carbonate does not warrant finer grinding than that practiced with this specimen, but laboratory work has shown that the products from the concentration table can be returned to the mills for further grinding and more complete recovery of the lime values if desired.

A large number of rock specimens from various parts of the United States, as well as some foreign specimens, have been treated experimentally in the Valley Forge laboratory by means of a laboratory type flotation cell. The results obtained have made it appear clear that considerable savings in grinding costs can be made by employing different flow sheets. Thus, some of the samples can best be treated by inserting the new procedure in closed-circuit grinding, others by employing two-stage grinding, with the treatment between stages; and in others the treatment may be similar to that practiced at Valley Forge.

Complete Correction of 700 Tons of 72.2% Calcium Carbonate Rock

	Mill stream	Hydro overflow	Cell feed	Concentrates	Rejects	Final mixture
Total tons	700.00	460.00	240.00	195.00	45.00	655.00
Total tons $CaCO_3$	505.40	327.00	178.80	169.60	9.00	496.70
Tons SiO_2	96.90	64.80	32.10	8.80	23.30	73.60
Tons Fe_2O_3	11.60	7.03	4.57	3.33	1.24	10.36
Tons Al_2O_3	37.38	25.90	11.48	3.43	8.05	29.30
Tons $MgCO_3$	46.40	31.10	15.30	13.4	1.90	44.50
Grade (%) $CaCO_3$	72.20	71.10	74.50	87.00	20.00	75.80
Grade (%) SiO_2	13.84	14.09	13.38	4.50	51.80	11.25
Grade (%) Fe_2O_3	1.66	1.53	1.90	1.71	2.74	1.58
Grade (%) Al_2O_3	5.34	5.63	4.77	1.76	17.89	4.48
Grade (%) $MgCO_3$	6.62	6.76	6.38	6.87	4.22	6.80
325-mesh fineness (%)	72.50	96.10	27.30	31.20	7.00	77.00

Chemical Destiny

In Paris, last month, "The House of Chemistry," international chemical headquarters, splendid combination of meeting place and library, was opened. At the inaugural banquet Mr. Hooker represented the American chemical industry, and this abstract of his address very graciously presents American chemical ideals.

By Elon H. Hooker

President, Hooker Electrochemical Company

CHEMICAL production as a world factor is young, and especially is the New World portion conscious of its oversize and under-correlation. We, therefore, approach this International Table with modesty appropriate in the presence of the great names of Lavoisier, Pasteur, Berthelot, Pierre and Marie Curie. It is a gracious thing you have done in allowing an American industrialist to open the door with you to this international fireside where the chemical industry of the world may meet in the warmth of French hospitality. On behalf of the foreign industrialists, then, may I, Monsieur le President, paraphrase a famous saying—"Berthelot, we are here!"

The story of pure and applied science memorialized in this noble and gracious building, is not one of retorts and crucibles and machines, but of the progress of the mind of man through superstition and ignorance in resolving the natural from the supernatural. In ancient times the hidden forces of nature were feared by the superstitious, adored by the devout, used by the skillful, understood by none. Then through ages of delusion and pestilence the secrets of earth and sky were sought in vain by alchemy and magic.

With the coming of the Age of Reason, however, there appeared the most dramatic figure in the story of Chemistry, Antoine Laurent Lavoisier, who completely overthrew these cabalistic ideas and discovered the theory of combustion. In more modern times the creative mind has worked with and against the powers of earth, air, fire and water and made nature more fertile, industry more productive, and life more abundant.

Research has yielded golden treasure in that shadowy borderland between nature and commercialized industry where mathematics and chemistry join hands in the great unknown, and the scientist, though chained to earth, scans time and space for an unknown perfection which he may never reach, but will forever seek. Your Pasteur has given the world a mighty weapon against the adverse forces of nature. Discovery of antiseptics has made modern surgery possible and the anaesthetic has made it bearable. Time man cannot master, but he has raised his hand against disease, and defied the inevitable. "It cannot be done, let us do it."

The modern industrialist is the foster-father of research. It is his responsibility to put in service today the discoveries which in the past, after generations of delay, have awaited ripened time.

He is moving among forces he increasingly controls, and even the riddles of famine, flood, pestilence, earthquake and the seasons are yielding their secrets to him. How natural then that he should begin to lean on himself for mastery of the world of his own vision and tend to forget the spiritual life! He first became absorbed in making useful things quickly and cheaply by mass production, and soon, especially in the so-called New World, forgot beauty. But now he begins to show eagerness to have the place in which he works and the things he makes more beautiful.

It becomes increasingly clear that while political, social and industrial progress presses on with the advance of mechanical and economic discovery, yet from time to time it loses momentum and is arrested by what the aviators call a *ceiling* through which it cannot rise further. Then from the whole field of scientific and industrial endeavor, it is invariably the Chemical Engineer, as we shall see, whose discoveries lift that ceiling.

The chemist has replaced sun bleaching with chlorine bleaching; papyrus with paper from chemically disintegrated and bleached wood; natural abrasives with synthetic abrasives; a few rather rare vegetable and animal dyes with a large number of cheaper and better synthetic dyes and other organic compounds of endless usefulness. He has found how to separate and purify the constituents of crude oil, and thus helped to revolutionize our methods of transport on land and sea and air. He has introduced alloys and non-corrosion into steel and re-enforced the native supply with electrolytically refined copper. Natural silk, once a luxury of the few, is supplemented by chemical artificial silk

available to the poor. The extraordinary growth of the automobile industry rests basically on the discovery that rubber can be vulcanized with sulfur, and upon the replacement of the rare and unstable natural resins for finishes and electric parts with vastly better synthetic ones.

Every chemical advance tends toward larger quantity at a cheaper price. In the last hundred years, it has not only increased luxury but also raised our standard of living and extended employment in general.

While the chemical industry has not been the greatest sufferer, all production in every country since the war has been facing problems of unemployment in the atmosphere of a restless, unsettled morale and a volatile and irresponsible public opinion. The irrepressible catalyst has been at work. Chemistry, as an instrument of self-reliance and confidence, has increased among peoples their use of human freedom. Benjamin Franklin, as a scientist, as well as statesman, tightened the bonds between our freedom loving nations and inaugurated the tradition we are perpetuating here tonight.

Liberty of the individual, with a minimum of government consistent with organized society, is the end to be sought. For one hundred and fifty years in America, as in France, we have followed that ideal. First, we owe the child an education, then a free economic opportunity. Experience has taught us that perhaps the State further owes him every opportunity for good health. Society owes a refuge to those defective in body and mind and unable to be cared for by their own. All this is part of our recognized system.

American economic thought, however, does not permanently accept proposals that those should be supported as a public charge who do not choose to make the effort to care for themselves, or would prevent others from doing so, or are not fitted to achieve the status they demand. There has been no demonstrated proof that the advent of the machine and new discoveries eventually destroy rather than increase the opportunity for labor.

Much has beeen said in recent years of the need to become citizens of the world rather than nationalists; that invention, discovery and communications have made accent on national life narrow and futile. I do not see that modern swift communications destroy identities. They are but causeways to easier understanding and intercourse between personalities. Nations are, or should be, gregarious just as individuals. Social life betweeen individuals increases sympathy and understanding, and constant contact smooths the asperities, but individuality remains. Conceived in that sense, a higher nationalism is not a step backward. A perfect suburban village is composed of orderly private homes, each complete in itself; and the more perfect each, the more perfect the whole.

It is in that spirit that efforts to make America self-reliant in the chemical field have been energetically furthered by the educational campaign of the Chemical Foundation. It has gone far to make our people conscious that their independence, well-being, and prosperity depend on the success of our chemists in attaining the forefront of discovery and progress.

Industry's Bookshelf

The Chemistry of the Solids, by C. H. Desch, 230 pages; Cornell University Press; $2.50.

Another in the series of chemical lectures at Cornell given under the auspices of the George Fisher Baker Non-Resident Chemical Lectures.

Conductometric Analysis, by Hubert T. S. Britton; 178 pages; Van Nostrand. $5.

Conductivity of solutions often supplies useful information not otherwise obtainable. Surprisingly very little has been published in this direction, and this volume (8th in a series of monographs dealing with various comparatively new phases of chemical technique and development) collects, digests and explains principles and methods.

Chemical Engineers' Handbook, John H. Perry, editor; 2609 pages; McGraw-Hill. $9.

For a number of years dire need of a handbook for both practicing engineer and student has been appreciated, but the task was simply enormous. In preparation of this volume, 60 leaders in their respective fields are responsible for the authority of its contents; in addition, 150 chemists and engineers contributed ideas and suggestions. Any attempt to list contents would require pages; sufficient to say that it is very complete. Value of many otherwise excellent handbooks is lessened because of improper or totally lacking indexing. This is not the case here.

Boiler Feed and Boiler Water Softening, by H. K. Blanning and A. D. Rich; Nickerson & Collins; 156 pages; $3.00.

A practical treatise on how to determine the cause of boiler scale and how to maintain clean heating surfaces, together with instructions for testing and treatment. It is a very useful boiler operators' manual.

Business Organization and Combination, by Richard T. Ely; 684 pages; The Macmillan Co. $3.00.

An analysis of the evolution and nature of business organization in the U. S. and a tentative solution of the corporation and trust problems. Book is satisfactory both as a textbook for the student of economics and business and also for the more mature mind of the business executive.

Mechanical Catalog, American Society of Mechanical Engineers, 23rd Annual Volume; 310 pages.

This issue is featured by a short description of the various companies included, such description being incorporated in the index; then follows the catalog, followed by an index of industrial equipment, materials and supplies, carefully cross-referenced.

Government Rules Industry, by Michael S. Gallagher; 241 pages; Oxford Press. $2.

Quite the best review of the legal aspects of NRA which has appeared. A very sane, fair review of the law itself, how it has been administered, and a careful balancing of the pros and cons as to the constitutionality of the entire program. Should be read by anyone with code responsibility.

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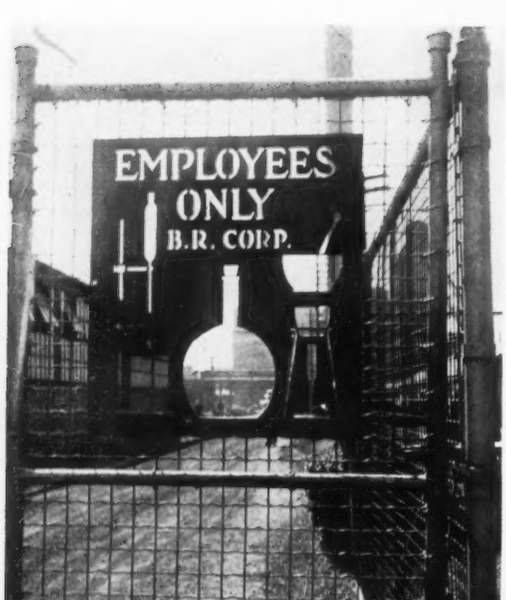
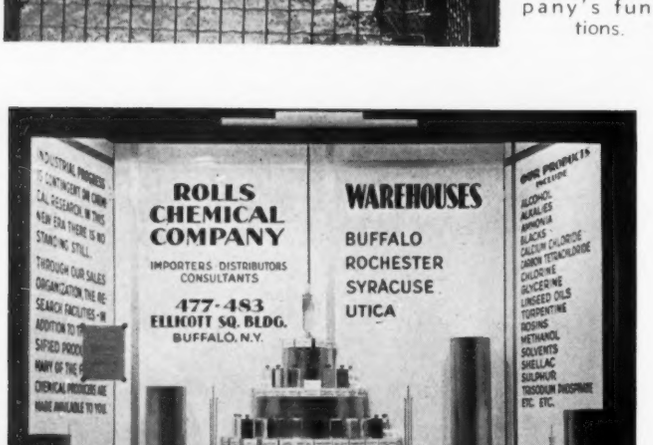


The gateway to chemical production at the Barium Reduction Corporation, in Charleston, W. Va. An appropriate reminder, to all who enter here, of the company's functions.



Left, center, H. J. Rolls, general manager, Rolls Chemical Company, recently observed some waste store-window space in their building, and developed the idea of renting this space for an exhibit of the company's products until such time as the space was leased permanently. This display evoked much favorable comment, and won for the company no little business. Upper right, Grasselli Chemical's exhibit at the ACS meeting, in Cleveland; and, lower left, another Grasselli exhibit at the National Metal Congress and Exposition, held in New York, last month. Company displayed their complete line of plating materials and accessories—a veritable fund of information on the subjects of electroplating, case-hardening, and metals treatment.

NEWS REEL

of Our Chemical Activities

Associated Press

The daughter of two famous scientists carries on. Mme. Curie-Joliot, daughter of the late M. and Mme. Curie, discoverers of radium, being welcomed by the Director of the Royal Institution; the occasion being the opening in London, last month, of the International Conference on Pure and Applied Physics. Distinguished scientists from fifteen countries attended.

Associated Press

Professor Friedrich Bergius, famous German chemist and Nobel prize winner, who celebrated his fiftieth birthday last month. Lower, the Industrial Laboratory, in the Battelle Memorial Institute, founded and endowed by Gordon Battelle and his mother, to promote research and education in metallurgy, fuels, and allied fields. Scene in laboratory shows fuel equipment and rolling mill.

In this age of chemical expansion, the broader education of man in the use of chemicals is going to be useful, and with this thought in mind several companies have recently held exhibits which have proved most successful and which are shown here. Above, the significance of plastics to the man on the street was emphasized in this display of vinyl resins in the Vinylite exhibit of Union Carbide & Carbon Corporation, at the Century of Progress.

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Chemical Consumption

A digest of new products and processes in process industries for the user of chemicals.

Crepe Rubber Resin Offers Wide Field of Use

By H. A. Endres
Goodyear Tire & Rubber Co.

Much interest has been aroused among manufacturers of coating materials in Pliolite resin, which promises to be of vital importance to the industry.

This new product, regarded as a signal achievement, is for use as a base in the manufacture of coating materials and finishes, and is derived from crepe rubber, which provides exceptional advantages in technical, industrial, and general applications.

The producers make it plain that it is not in any sense an all-purpose finish, but is used as a vital ingredient in a variety of coatings, each to meet specific requirements in the industrial and architectural maintenance fields.

According to claims made by the company, Pliolite resin may be formulated into finishes for practically all kinds of surfaces, such as metal, wood, concrete, stone, masonry, and plaster.

Particular attention is directed to its characteristics and outstanding properties. In general, it shows remarkable resistance to acids, alkalies, and corrosive chemicals. It also very effectively withstands moisture penetration as proved by salt water spray and immersion tests on iron, steel, and concrete. Films from Pliolite enamels adhere extremely well to metals, concrete, glass and wood, while another valuable property is its ready solubility in cheap solvents, such as varnish makers' naphtha and turpentine substitutes. It is insoluble in alcohol, acetone, and the commonly used lacquer solvents, and is tasteless, odorless, and non-toxic, with excellent electrical properties. Its base color is light enough so that all manner of bright-colored enamels can be readily developed. The film secured is hard and flexible and exhibits remarkable adhesion to the surface to which it is applied. Coatings formulated with it may be applied by brushing, spraying, or dipping.

An important part in the development of this remarkable substance was the devising of improved technique for incorporating pigments into the resin. This is a much less expensive method of mixing than the wet way of grinding powders into solution, giving more efficient dispersion of the pigment, with a better gloss to the dried film.

If still higher pigmentation is desired, additional pigments, ground in the usual manner, may be readily mixed with the solution of the compounded resin.

These master mixes, or Pliolite bases, each one compounded with the maximum amount of one or more pigments or fillers, are made by direct incorporation, while the resin is being processed on a mill. These bases are then dissolved in a solvent at room temperature. For many specialty requirements these solutions may be directly used as a finished material, except that it is frequently desirable to add at least a low percentage of some plasticizer.

Since the solvents used with this resin are given up very readily, coatings containing this new product quickly set to the touch and gradually oxidize to form hard, glossy, but flexible films. This hardening effect is accelerated by exposure to light, by baking, and by the use of metallic soap driers. Acidic pigments such as titanium dioxide, iron oxide, and chromium oxide also hasten the hardening process, in contrast to the well-known effect in linseed oil paints.

If it is not carried too far, this drying effect improves the efficiency of the coating for all sorts of difficult service, such as resistance to scraping and abrasive wear, and the ability to withstand the solvent effect of oil and gasoline.

Films made from compounded Pliolite resin can be made impervious to their own solvent by baking. For air drying, the same result can be obtained by the judicious use of mild drying agents, such as manganese or lead-manganese driers.

As previously mentioned, generally a low percentage of some plasticizer should be used with the bases. As possibilities for this purpose, tricresyl-phosphate, ethyl abietate, and butyl stearate, as well as several of the chlorinated diphenyls, are effective plasticizers and can be used in amounts up to 30% or more of the resin. For general purposes, drying oils are the plasticizers usually recommended by the company—Chinawood oil for metal enamels and linseed for application to wood.

Due to the ability to increase the ratio of drying oils to the resin by the addition of some synthetic resin or gum, the company has supplemented its original series of Pliolite bases, for which the resin was mixed only with pigments or fillers, with a number of new master mixes, which consist of blends of the resin with other resins or gums. For example, by using a mixture of two-thirds Pliolite resin and one-third synthetic resin, a base is secured which may be cooked with oils, yielding a transparent baking finish. This promises to be an excellent resistant film, and to fill many other special varnish requirements.

Some of the outstanding qualities of the resin indicate the

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value and importance of this new ingredient, as follows:

1. They dry by rapid and uniform evaporation of the solvent, and harden by oxidization. This hard film affords maximum protection under conditions of service.

2. Bond tenaciously with, and adhere to, any dry, clean surface, provided loose or unstable coatings, such as blistered paint, rust, etc., are first removed.

3. Can be used in painting concrete without using primer or sealer to remove lime and shut out moisture.

4. Exhibit excellent adhesion to iron, steel, and non-ferrous alloys.

5. Can be formulated in any color.

6. Can be formulated to produce high gloss, medium gloss or flat finish, as desired.

7. Level readily, with entire absence of brush marks, or "orange peel."

8. Essentially non-skinning, and when desired they can be so formulated that no skin whatever will develop.

Attention is also called to the fact that coatings containing this resin can be successfully applied to clean, dry surfaces in cold weather without an abnormal increase in drying time.

Pliolite baking primers are formulated to provide flexibility, adherence to metals, resistance to corrosion by rusting. They require a rather short, high-temperature bake, and when sanded serve as excellent undercoats for finishes of all types. If desired they can be formulated to inhibit rust.—*Abstracted from Paint, Oil & Chemical Review.*

Textiles

General Dyestuff has released the following: DIAZO INDIGO BLUE BRA EXTRA, which produces with Beta Naphthol a bright, easily dischargeable shade. OXYDIAMINOGEN O T A, especially recommended as a substitute for aniline black at comparatively low cost. When diazotized and developed with DEVELOPER MT, yields a jet black shade of very good dischargeability. INDANTHREN GREEN GG EX. PASTE FINE, new homogeneous dyestuff, possessing great tinctorial strength. Yields much yellower shades of green than INDANTHREN BRILLIANT GREEN B. INDANTHREN RED BROWN R R PASTE, recommended only for dyeing purposes, especially curtains, awnings, and hangings, and for goods where fastness to washing is important. FASTUSOL BLUE LFFGL, new dyestuff of the FASTUSOL L range, shows extreme brilliancy of shade and high fastness properties. Is dyed with common salt or Glauber's salt and Igepon T, without soda. CELLITAZOL B N, a new form of the B brand, can be applied from a soap bath, and will permit the combination with such Celliton colors which will not change in the diazotizing and developing. INDANTHREN KHAKI 2 G A PASTE, recommended for dyeing only. RAPIDOGEN RED ITR, a pleasing clear shade, with superior fastness properties, rendering it especially suitable for textile printing.

ACID ALIZARINE FLAVINE RA, manufactured by General Aniline, offered by General Dyestuff, a new chrome yellow, dyed according to the usual chrome-topped method; may also be used according to chromate method. Produces bright reddish yellow, dyes level, and is ideal chrome yellow for combination shades.

PALATINE FAST YELLOW EL, new brand of PALATINE FAST colors, brought out by I. G., marketed by General Dyestuff, is distinguished by its level dyeing properties. Dyes in usual way from a strong sulfuric acid bath, or from a weaker bath if PALATINE FAST SALT SOLUTION is used.

Patents—Textile

Process for impregnating thick textiles with latex under great hydraulic pressure. No. 1,974,879. Juan Duarry-Serra, Barcelona, Spain.

Process production artificial silk filaments. No. 1,974,273. Hugo Hofmann, Johnson City, Tenn., to American Bemberg Corp., New York, N. Y.

Preparation wetting composition, comprising an ester of a fatty sulfo-acid. No. 1,974,007. Heinrich Bertsch, Chemnitz, Germany, to H. Th. Bohme, Aktiengesellschaft, Chemnitz, Saxony, Germany.

Process for sizing artificial silk; preparation consisting of a drying oil and a practically non-drying oil. No. 1,973,998. Paul Schlack, Berlin-Lichtenberg, and Ernst Sauter, Berlin-Karlshorst, Germany, to Aceta G.m.b.H., Berlin-Lichtenberg, Germany.

Method and apparatus for manufacture artificial silk. No. 1,973,953. Beirne Gordon, Jr., Utica, N. Y., to Skenandoa Rayon Corp., Utica, N. Y.

Process textile manufacture; use of organic derivatives of cellulose in juxtaposition to another fabric, embossing so as to cause yarns of cellulose derivatives to partially coalesce and adhere to other fabric at embossed portions only. No. 1,972,923. Camille Dreyfus, New York, N. Y., and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, Del.

Method improving fastness textile dyes; using organic derivatives of cellulose and including thiourea in the materials; retaining thiourea in materials during any subsequent finishing treatment. No. 1,972,111. Geo. Rivat, Lyon, France, to Celanese Corp. of America, Delaware.

Metals and Alloys

Much attention has been given in recent years to the so-called "rare elements," several of which could be made available in quantity if the demand arose, and a large field of chemical investigation is awaiting attention in this direction. A "Bibliography of Indium," by Potratz and Ekeley, has just been published by the University of Colorado (*Studies*, 21, No. 3; 1934), in which communications to the literature from the date of the discovery of the metal in 1863 to 1933 are listed in a classified system. Most of the work on indium appears to have been published in Germany and the U. S., although England is represented by the work of Carpenter and Tamura on twinned metallic crystals, older work of Roberts-Austin and Carnelly, and an investigation of indium acetylacetone by Morgan and Drew.

Concentrating Oxidized Minerals

Process outlined in U. S. P. 1,972,247 suggests concentrating oxidized ore containing one or more minerals of the group consisting of malachite, azurite, cerussite, and chrysocolla, by subjecting the ore in the form of a pulp to a froth flotation operation in the presence of an alkali metal dithiocarbamate.

Froth Flotation

A froth-flotation process given in U. S. P. 1,972,588, for concentrating oxidized minerals from oxidized ores, comprises treating an oxidized-ore pulp with one of the following fluosilicates: copper, silver, zinc, cadmium, mercury, or lead; to activate the oxidized minerals, subjecting treated oxidized-ore pulp to froth-flotation process in the presence of a selector reagent.

Metal Detergent

A composition for cleaning metallic surfaces, given in U. S. P. 1,967,394, contains approximately 4 parts trisodium phosphate, 0.4 parts of a sulfonic acid derivative of an alkylated aromatic hydrocarbon containing at least two benzene nuclei, and one part of an organic solvent immiscible with water.

Patents—Metals, Alloys

Process for surface hardening ferrous metals. No. 1,975,064. Vincent T. Malcolm, Indian Orchard, Mass., to Chapman Valve Manufacturing Co., Indian Orchard, Mass.

Process hardening ferrous metals by immersion in a molten bath of cyanide salts activated by a flow of ammonia gas. No. 1,975,058. Wilbur R. Bennett, Maplewood, N. J., to Bennett-Chapmanizing, Inc., Springfield, Mass.

Production castings of high hardness and low thermal expansivity; addition to a molten aluminum base alloy a metal of the group of sodium, potassium, rubidium and caesium, then casting molten alloy in a permanent mold. No. 1,974,971. Aladar Pacz, Cleveland, O., to Aluminum Co. of America, Pittsburgh, Pa.

Aluminum-manganese alloy; alloy being of a fine-grained and uniform-grained structure, capable of being worked without substantial roughening of the metal surface. No. 1,974,970. Jos. A. Nock, Jr., Tarentum, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Aluminum-magnesium alloy containing magnesium and molybdenum, characterized by a small and uniform grain size. No. 1,974,969. Jos. A. Nock, Jr., Tarentum, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

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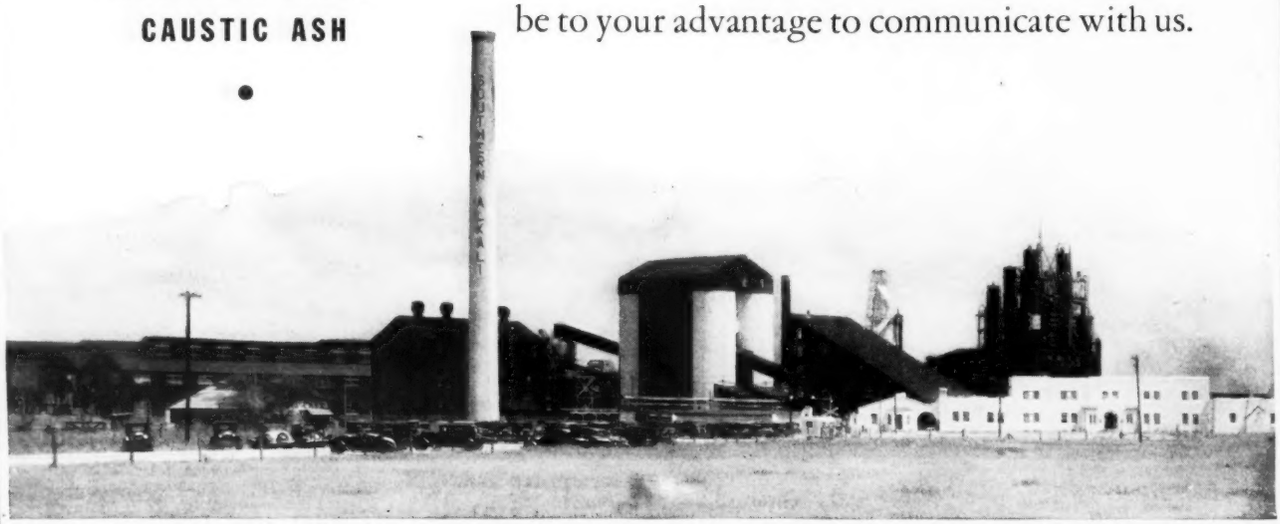

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Alloy of copper, beryllium and nickel; the beryllium content being always in excess of the nickel, whereby the grain size is reduced and the workability improved. No. 1,974,839. Horace F. Silliman, Waterbury, Conn., to American Brass Co., Waterbury, Conn.

Preparation of alloy consisting of a nickel, at least one alkaline earth metal, and copper. No. 1,974,060. Hugh S. Cooper, Cleveland, O., to Kemet Laboratories Co., Inc., New York.

Process descaling chromium nickel iron alloy sheets, final step being subjection to a pickling bath consisting only of nitric and hydrofluoric acids. No. 1,974,571. Geo. C. Kiefer, Springdale, Pa., to Allegheny Steel Co., Brackenridge, Pa.

Pickling solution for removing scale of highly refractory, closely adherent nature, such as that acquired by chromium-containing alloy steels. No. 1,974,570. Geo. C. Kiefer, Springdale, Pa., to Allegheny Steel Co., Brackenridge, Pa.

Process and apparatus for electroplating. No. 1,974,441. Bjorn Andersen, Newark, N. J., to Celluloid Corp., Newark, N. J.

Preparation flux for soft soldering metals composed of zinc chloride and a sulfate of an aliphatic compound containing an alcoholic hydrocarbon radicle. No. 1,974,436. Wm. K. Schweitzer, East Cleveland, O., to Grasselli Chemical Co., Cleveland, Ohio.

Process recovery zinc, lead, tin, and cadmium values from metalliferous materials. No. 1,973,590. Geo. F. Weaton, Herand K. Najarian, and Wm. C. Dowd, Beaver, Pa., to St. Joseph Lead Co., New York, N. Y.

Method froth flotation separation of zinc sulfide ores containing copper compounds. No. 1,973,578. Jos. P. Ruth, Jr. and Frederick A. Brinker, Denver, Colo., to Frederic A. Brinker, Denver, Colo.

Manufacture hard alloy having boron carbide as the main constituent. No. 1,973,441. Kurt Moers, Berlin-Charlottenburg, Karl Schroeter, Berlin-Lichtenberg, and Hans Wolff, Berlin, Germany, to Fried, Krupp Aktiengesellschaft, Essen-am-Ruhr, Germany.

Production a hard cemented carbide material containing tungsten, tantalum and titanium carbides, and an auxiliary metal of group consisting of cobalt, iron and nickel. No. 1,973,428. Gregory J. Comstock, Edgewood, Pa., to Firth-Sterling Steel Co., McKeesport, Pa.

Preparation hard metal composition consisting of titanium carbide, tungsten, and aluminum. No. 1,973,422. Elmer B. Welch, McKeesport, Pa., to Firth-Sterling Steel Co., McKeesport, Pa.

Production an alloy consisting of lead, antimony, and vanadium in given proportions. No. 1,973,302. Robt. J. Wiseman, Passaic, and Benj. B. Reinitz, Paterson, N. J., to Okonite-Callender Cable Co., Inc., Paterson, N. J.

Method purification zinc sulfate solutions containing ferric iron; converting ferric iron to ferrous iron by action of an appropriate reducing agent. No. 1,973,300. Jos. Camillus Thompson, Jr., Palmerton, Pa., to New Jersey Zinc Co., New York, N. Y.

Treatment zinciferous materials. No. 1,973,295. Arne J. Myhren, Palmerton, Pa., to New Jersey Zinc Co., New York, N. Y.

Production pearlitic cast iron; an alloy containing nickel, molybdenum, carbon, silicon, manganese, and iron. No. 1,973,263. H. Alton Mitchell and Jas. L. Cawthon, Jr., Columbus, Ohio, to Bonney-Floyd Co., Columbus, O.

Treatment metals for removal foreign matter and pickling the surface. No. 1,973,087. John W. Markley and Thos. W. Clement, Washington, Pa., to Peerless, Inc., Penn.

Treatment aluminum by melting a quantity of aluminum, adding small per cent. by weight of copper impregnated with arsenic, and stirring to obtain a homogeneous molten mixture. No. 1,973,040. Robt. Beyer, Brooklyn, N. Y., to Beyer Research Labs., Inc., Dover, Del.

Coating ferrous articles with zinc by electro-deposition. No. 1,972,835. Urlyn Clifton Tainton, Balto., Md.

Froth-flotation process; being treatment of an oxidized-ore pulp with a fluosilicate. No. 1,972,588. Mahlin S. Hansen, Indianapolis, Ind., to Peter C. Reilly, Indianapolis, Ind.

Producing a pure aluminum-silicon alloy by filtering a molten aluminum-silicon alloy containing non-metallic, especially carbidic, impurities, at a temperature at which no substantial segregation of metallic silicon in solid form occurs. No. 1,972,432. Conway (Baron) von Girsewald, Frankfort-am-Main, and Oskar Shober, Horrem, near Cologne-am-Rhine, Germany, to American Lurgi Corp., New York, N. Y.

Method inhibiting oxidation of molten magnesium by maintaining a fluorine-containing atmosphere in contact with surfaces of magnesium. No. 1,972,317. Hans A. Reimers, Midland, Mich., to The Dow Chemical Co., Midland, Mich.

Method uniting synthetic resin and metal. No. 1,972,307. Emil C. Loetscher, Dubuque, Iowa.

Process for treatment iron alloys containing up to a maximum of approximately 0.9% carbon, and from 0.5% to 5.0% copper. No. 1,972,248. Cyril Stanley Smith, Cheshire, Conn., to Copper & Brass Research Ass'n, New York, N. Y.

Concentration of oxidized minerals. No. 1,972,247. Ralph E. Sayre, Middlesex County, N. J., to American Smelting & Refining Co., New Jersey.

Method steel production containing up to 1.00% carbon and up to approximately 2.00% manganese, by alloying from 0.50% to 5.00% copper. No. 1,972,241. Clarence H. Lorig, Horace W. Gillett, and Harry B. Kinnear, Columbus, O., to Copper & Brass Research Ass'n, New York, N. Y.

Process treatment silicon alloy castings. No. 1,972,103. Jas. A. Parsons, Dayton, O., to Duriron Co., New York.

Leather

Certain compounds of urea and aldehydes can be used for tanning hides and skins; producing leathers (especially white leather) which possess valuable and desirable physical attributes. In a patent issued to Ralph E. Porter, he states that "if urea and an aldehyde, *i. e.,* formaldehyde, are allowed to react upon each other in an aqueous solution, there is finally formed an insoluble compound, or condensation product, which has some values for tanning purposes. He has found, however, that if this aqueous solution of urea and formaldehyde, for instance, be employed, prior to the formation of the insoluble product, valuable tanning results will be obtained, which are of much better penetration and more uniform than those produced with the insoluble compounds.

Patents—Tanning Leather

Preparation with use of ferments hides or skins for tanning; treatment with an aqueous extract of an animal organ containing cathepsin, with addition of an activating substance having a reducing effect. No. 1,974,889. Robt. Biedermann, Basel, Switzerland, to J. R. Geigy S.A., Basel, Switzerland.

Improved production leather; subjecting skin before tanning to treatment with a solution of a washing and emulsifying agent obtained from a pyro-phosphate and any natural, vegetable or animal albumen. No. 1,974,861. Giorgio Chiera, Torino, Italy, to J. R. Geigy, A.G., Basel, Switzerland.

Process dehairing hides and skins by immersion in a solution of any alkaline dehairing agent to which has been added an organic compound containing the sulfhydryl (-SH) group. No. 1,973,130. Harold G. Turley, Moorestown, N. J., and Wallace Windus, Bristol, Pa., to Rohm & Haas Co., Phila., Pa.

Tanning animal hides by treatment with a water soluble condensation product of para-dihydroxy-diphenyl-sulfone and sulfur chloride. No. 1,972,798. Josef Schafer, Basel, Switzerland, to J. R. Geigy, S.A., Basel, Switzerland.

Tanning animal hides by treatment with a water soluble condensation product of para-dihydroxy-diphenyl-sulfone and an aldehyde. No. 1,972,797. Josef Schafer, Basel, Switzerland, to J. R. Geigy, S.A., Basel, Switzerland.

Manufacture tanning compounds, by heating a dihydroxy-diphenyl-sulfone-carbinol acid with an aromatic sulfonic acid in aqueous acid solution. No. 1,972,754. Robt. Biedermann, Basel, Switzerland, to J. R. Geigy, S.A., Basel, Switzerland.

Chemical Specialties

A solution of naphthalene green, highly conc. (Color Index No. 735, Schultz No. 564), ammonium meta vanadate, thymol, phenol, ethylene glycol, and water, according to U. S. P. 1,972,395, provides a writing ink of permanent brilliant color.

Mold Lubricant

Cocoa Soapstock, a material containing a large percentage of cocoanut oil saponified with alkalis to give a pure hard soap, makes a suitable product for lubricating molds to prevent sticking of the vulcanized stock. If properly made, without traces of sodium silicate, it will not cause caking on the molds. The recommended quantity is 8 to 12 lbs. to a 55 gal. drum of water. The soap is dissolved in water by cooking, either by open steam or external heat of some kind. For easy spraying the solution is kept warm by steam or a small electric heating unit can be applied at the spray nozzle to prevent clogging.—*Rubber Age*, Oct. '34, p. 24.

Colored Concrete

In U. S. P. 1,972,207, colored concrete is prepared by mixing water, a calcareous substance, and a finely divided coloring material in the presence of a soluble compound obtained by condensing formaldehyde with a sulfonic acid of the naphthalene series.

Light Colored Keene's Cement

The manufacture of a light colored Keene's cement, from a calcium sulfate containing iron as an impurity, comprises producing anhydrous calcium sulfate through calcination, and forming a substantially colorless iron salt therein by reaction between the iron compound and a sulfate. Method given in U. S. P. 1,972,888.

Patents—Chemical Specialties

Fly insecticide, comprising solution of a compound of formula $R_1.COO.CH_2.CH_2.SO_3Na$, wherein R_1 stands for an aliphatic radical having more than 3 carbon atoms, in an organic substance capable of killing or eliminating flies. No. 1,975,054. Adolf Steindorff and Kaspar Pfaff, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., New York, N. Y.

Process for coloring shoe-blackings, polishing and floor waxes, characterized by use of cetyl alcohol for distributing dyes. No. 1,974,854. Walter Schrauth, Berlin-Dahlem, Germany, to "Unichem" Chemikalien Handels A.-G., Zurich, Switzerland.

Cement composition composed of a dry mixture of ground aggregate, a readily soluble powdered sodium silicate and sodium fluosilicate in a proportion which completely neutralizes the sodium oxide of the silicate. No. 1,973,732. Foster Dee Snell, Brooklyn, N. Y.

Manufacture acid and waterproof cements by mixing of siliceous material and sodium silicate, adding to siliceous material aluminum hydrate to form an aluminum silicate. No. 1,973,731. Foster Dee Snell, Brooklyn, N. Y.

Chemical insecticide of a benzene or naphthalene nucleus. No. 1,974,689. Kaspar Pfaff and Michael Erlenbach, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., New York, N. Y.

Disinfectant, useful as bactericide, microbicide, and fungicide, comprising a derivative of dithiocarbamic acid. No. 1,972,961. Wendell H. Tisdale and Ira Williams, Wilmington, Del., to E. I. du Pont de Nemours & Co, Wilmington, Del.

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Warehouses: **Providence, R. I., Philadelphia, Pa., Utica, N.Y., Chicago, Ill., Greenville, S. C., Chattanooga, Tenn.**

Treatment tobacco. No. 1,972,718. Herman Sharlit, New York, N. Y.

Composition dry powdered soap, containing powdered soap, sawdust, and vegetable oil. No. 1,972,458. Leonard H. Phillips, Somerville, Mass.

Thermoplastic adhesive with reduced penetrating power; self-healing, substantially odorless and tasteless, comprised of chlorinated polyphenyls, a plasticizer, and a pigment. No. 1,972,448. Russell L. Jenkins, Anniston, Ala., to Swann Research, Inc., Birmingham, Ala.

Writing ink of permanent brilliancy. No. 1,972,395. Galen H. Sayler, Janesville, Wis., to Parker Pen Co., Janesville, Wis.

Process colored concrete; mixing water, a calcareous substance, and a finely divided coloring material in the presence of a soluble compound, obtained by condensing formaldehyde with an aromatic sulfonic acid. No. 1,972,208. Geo. R. Tucker, No. Andover, Mass., Chas. W. Tucker, administrator of said Geo. R. Tucker, deceased.

Process colored concrete. No. 1,972,207. Geo. R. Tucker, No. Andover, Mass.; Chas. W. Tucker, administrator of said Geo. R. Tucker, deceased.

Miscellaneous

The following combination of fats is claimed to give a soap having maximum detergent action.

Fat	*Percentage*
Tallow	46.5
Coconut oil	15.5
Rosin	4.0
Linseed oil	3.0
Peanut oil	31.0

The proportions represented of low molecular weight fatty acids, normal fatty acids, high molecular weight fatty acids, and unsaturated fatty acids give maximum wetting and emulsifying power. R. L. Datta and S. S. D. Gupta. *Soap, Perfumery and Cosmetics Trade Rev.* 7, No. 6, 10-11 (1934).

Dry Powdered Soap

A composition in dry powder form adapted to form a homogeneous paste upon the addition of water, given in U. S. P. 1,972,458. Contains major proportion of powdered soap, sufficient sawdust to constitute an abrasive, enough vegetable oil to coat the sawdust particles to cause them to remain dispersed throughout the paste, an alkali, *i. e.*, caustic soda, in an amount sufficient to render the oil water-miscible, and a neutralizing medium, such as powdered rosin sufficient to neutralize the excess dissolved alkali in the paste.

Patents—Miscellaneous

Rubber

Preparation acid derivatives of a reaction product of SO_2 and an aliphatic aldehyde-amine product. No. 1,973,918. Deal H. Tompkins, Nitro, W. Va., to Rubber Service Laboratories Co., Akron, O.

Process rubber vulcanization; incorporating into rubber an accelerator of the combination of a mono- and a tri-xylil guanidine; then heating mixture with a vulcanizing agent. No. 1,973,914. Geo. H. Stevens, Newark, N. J.

Method manufacture sponge rubber coated fabric having a rough porous surface. No. 1,973,904. Thos. M. Knowland, Watertown, Mass., to Boston Woven Hose & Rubber Co., Cambridge, Mass.

Preparation vulcanization accelerator; new sulfur-containing organic compounds comprising reaction a 2-mercaptoarylenethiazole with formaldehyde and a secondary amine. No. 1,972,918. Hugh Mills Bunbury, Prestwich, John Stanley, Herbert Davies, Crumpsall, Wm. Johnson Smith Naunton, Prestwich, and Robt. Robinson, Oxford, England, to Imperial Chemical Industries, Ltd., London, England.

Cellulose

Manufacture cellulose ester plastic film containing a plasticizer comprised of mono-beta-naphthyl diphenyl phosphate. No. 1,974,024. Henry James Hands, London, England, to Spicers, Ltd., London, England.

Production cellulose butyro-acetate insoluble in coal-tar hydrocarbons; by treating a cellulose with acetic acid, then with butyric acid, acetic anhydride and an esterification catalyst in mixture. No. 1,973,693. Wyly M. Billing and John S. Tinsley, Kenvil, N. J., to Hercules Powder Co., Wilmington, Del.

Conditioning viscose solutions for impregnation and other purposes; an ungelled viscose solution whose free alkali content has been neutralized at least in part with boric acid. No. 1,974,755. Milton O. Schur, Berlin, N. H., to Brown Co., Berlin, N. H.

Chemical pulping process; smelting the inorganic content of spent cooking liquor to produce a smelt containing sodium sulfide and sodium carbonate and dissolving smelt in water. No. 1,974,751. Geo. N. Richter, Berlin, N. H., to Brown Co., Berlin, N. H.

Process and apparatus for manufacture seamless, flexible tubing from cellulose solutions. No. 19,329. Reissue. Richard Weingand, Bomlitz, near Walsrode, Germany, to Sylvania Industrial Corp., Fredericksburg, Va.

Process utilizatior fibrous materials. No. 1,973,637. Elbert C. Lathrop and Fergus A. Irvine, Chicago, Ill., to Celotex Co., Chicago, Ill.

Production cellulose unit composed of wood laminations, adjacent laminations bound together by a substantially co-extensive film of an adhesive of reverted cellulose. No. 1,973,571. Irving Fink Laucks, Seattle, Wash., to I. F. Laucks, Inc., Seattle, Wash.

Method pulp manufacture by treating wood with a liquor containing a sulfite of sodium and both sodium carbonate and sodium bicarbonate. No. 1,973,557. Linn Bradley, Montclair, N. J., and Edw. P. McKeefe, Plattsburg, N. Y., to Bradley-McKeefe Co., New York, N. Y.

Production alkali cellulose, poor in water, containing an excess of caustic alkali; first impregnating a cellulosic body with an aqueous liquid, finally treating residue with caustic alkali in the solid state. No. 1,973,491. Leon Lilienfeld, Vienna, Austria.

Composition composed of cellulose acetate and a copal resin which has been heated with nitric acid. No. 1,973,489. Neil S. Kocher, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Process production cellulose ethers. No. 1,973,478. Chas. Granacher, Basel, and Karl Meier, Zurich, Switzerland.

Manufacture or treatment of filaments, yarns, or threads of cellulose derivatives. No. 1,972,924. Henry Dreyfus, London, England.

Process and apparatus for manufacture artificial filaments through use of an organic derivative of cellulose in a volatile solvent. No. 1,972,922. Camille Dreyfus, New York, N. Y., and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, Delaware.

Moistureproof material comprising sheet or film of cellulosic material having a smooth, dense and non-porous surface. No. 1,972,869. Wm. Hale Church, Buffalo, and Wm. L. Hyden and John C. Siemann, Kenmore, N. Y., to Du Pont Cellophane Co., Inc., New York, N. Y.

Manufacture plied aqueous cellulose film, having a base derived from a translucent and hydrophil aqueous cellulose. No. 1,972,383. Fred W. Hochstetter, Pittsburgh, Pa.

Molding cellulose derivative plastics of multi-colored effects by softening and forcing same under suitable pressure into a die or mold. No. 1,972,166. Geo. Schneider, Montclair, Arthur E. Petersen, Westfield, and Manual R. Ximenez, So. Plainfield, N. J., to Celanese Corp. of America, Del.

Manufacture mixed cellulose ethers, by treatment alkyl ethers of cellulose with alkylene oxides. No. 1,972,135. Henry Dreyfus, London, England.

Acyl-oxy-acyl derivatives of cellulose; acyl group being attached to oxyacyl group. No. 1,972,134. Henry Dreyfus, London, England.

Cuprammonium process for dissolving cellulose. No. 1,972,098. Werner Kleinicke, Patchogue, N. Y., to Johnson-Losee Corp., Long Island City, N. Y.

Composition comprising a cellulose derivative and a lauryl phthalate. No. 1,972,091. George De Witt Graves and Walter Eastby Lawson, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Composition of a cellulose derivative and an ester of an organic polycarboxylic acid. No. 1,972,092. Geo. De Witt Graves and Walter Eastby Lawson, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Coatings and Plastics

Method molding plastic articles. No. 1,974,219. McConnell Shank, Akron, Ohio, to B. F. Goodrich Co., New York, N. Y.

Manufacture plastic substance by reacting together the product of the reaction of a saccharide of the group of mono- and di-saccharides and an aldehyde, and an aliphatic carboxylic acid. No. 1,974,064. Arthur S. Ford, New York, N. Y., to Industrial Sugar Products Corp., New York, N. Y.

Production plastic composition; mixing coloring material and white lead with linseed oil and varnish, mixing into this composition castor oil to retard drying and give elasticity to composition. No. 1,973,964. Vendope L. Pistocco, Ft. Worth, Tex., to Screen Advertising, Inc., Dallas, Tex.

Method for hydrogenating resinous compounds, by subjecting compound in solution in an inert solvent, to which an activating acid has been added, to hydrogenation in the presence of a noble metal catalyst. No. 1,973,865. Rollin J. Byrkit, Jr., Marshallton, Del., to Hercules Powder Co., Wilmington, Del.

Production liquid oleoresinous coating composition consisting of a drying oil and a chlorinated polyphenyl. No. 1,974,801. Russell L. Jenkins, Anniston, Ala., to Swann Research, Inc., Birmingham, Ala.

Production oleoresinous coating composition containing a vehicle and a pigment; pigment comprising a chlorinated diphenyl having approximately the formula $C_{12}HCl_9$. No. 1,974,799. Lewis D. Gittings, Anniston, Ala., to Swann Research, Inc., Birmingham, Ala.

Permanently plastic calking compound comprising nitrocellulose, a non-volatile solvent softener (being one of the group of dibutyl phthalate), tricresyl phosphate, di-amyl phthalate and tributyl phosphate, and a filler. No. 1,974,745. Gustave Klinkenstein, Maplewood, N. J., to Maas and Waldstein Co., Newark, N. J.

Production synthetic resin, using a reaction mass containing a polyhydric alcohol, a polybasic acid, and acids obtainable by hydrolyzing a drying oil. No. 1,974,742. Horace H. Hopkins, Wilmington, and Frank A. McDermott, Claymont, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process for resinous composition from phenol and acetaldehyde. No. 1,974,605. Carleton Ellis, Montclair, N. J., to Ellis-Foster Co., Montclair, N. J.

Process reacting an aliphatic hydrocarbon containing a double bond with CO. No. 1,973,662. Jacques Schaack, Chicago, Ill., to Van Schaack Bros., Chem. Works, Inc., Chicago, Ill.

Manufacture plastic compositions by formation of a sheet containing an ester of cellulose having an unsaturated acyl group, then treating the skin with a polymerizing agent. No. 1,973,493. Carl J. Malm and Chas. R. Fordyce, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Manufacture lacquer. No. 1,973,488. Neil S. Kocher, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Process manufacture resinous condensation products of aldehydes with phenol and urea. No. 1,973,050. John Willies Crump, Westminster, London, England, to Bakelite, Ltd., London, England.

Process for synthetic resins. No. 1,972,521. John W. Iliff, Ridley Park, and Paul Robinson, Lansdowne, Pa., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method producing variegated articles of plastic material. No. 1,972,503. Roland E. Walker, No. Brookfield, Mass., to Quabaug Rubber Co., No. Brookfield, Mass.

Method finishing fibrous surfaces by applying to surfaces a colloidal suspension in water of an undissolved resinous material insoluble in water but soluble in organic solvents. No. 1,972,502. Frank Tuchfarber, deceased, late of Cincinnati, O., by Wm. K. Divers, administrator, Cincinnati, O., to R. W. Callaway, New York, N. Y., and Alan N. Mann, Scarsdale, N. Y.

Manufacture condensation products by adding to the fluid initial condensation product of formaldehyde and a urea. No. 1,972,110. Kurt Ripper, Vienna, Austria, to Synthetic Plastics Co., Inc., New York, N. Y.

Petroleum

Process refining cracked hydrocarbon distillates, subjecting said distillate to the action of an aldehyde in the presence of hydrochloric acid and a metal. No. 1,974,311. Ime Levine, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Process conversion hydrocarbon oils. No. 1,974,303. Alfred Fisher, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Treatment hydrocarbon oils. No. 1,974,301. Gustav Egloff, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill

Treatment hydrocarbon oils. No. 1,974,295. Jos. G. Alther, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Method refining hydrocarbon oil. No. 1,974,170. Chas. R. Baker, Wood River, Ill., to Standard Oil Co., Whiting, Ind.

Process production anti-knock gasoline; electrolyzing fused sodium chloride in the presence of lead to form chlorine and a lead-sodium alloy. No. 1,974,167. Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Whiting, Ind.

Process decolorizing mineral oil, by addition finely divided coloring clay to a body of the oil, then injecting a gaseous acid anhydride of a strong acid into oil. No. 1,974,089. Chester Tietig, Los Angeles, Cal.

Process for lubricating oil. No. 1,973,824. Rudolph C. Osterstrom, Chicago, Ill., to Pure Oil Co., Chicago, Ill.

Process refining and purifying mineral oil; extracting undesirable constituents with a solvent liquid obtained by neutralizing or acidifying the extract derived from caustic washing unrefined cracked petroleum distillate. No. 1,974,805. Louis A. Clarke, Fishkill, N. Y., to Texas Co., New York, N. Y.

Hydrocarbon oil cracking process. No. 1,974,797. Nicholas de Rachat, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Lubricating oil; compound of neutral oil stock and a dye essence derived from a cracked petroleum residue, compound having a red tint transmitted light and a greenish fluorescence by reflected light. No. 1,974,778. Fred R. Lang, Wood River, Ill., to Crown Central Petroleum Corp., Balto., Md.

Treatment lubricating oils; mixing and agitating the neutral oil stock with a cracked petroleum residue, subjecting mixture to an acid treatment, with further subjection to a contact treatment with filter clay. No. 1,974,777. Wm. O. Keeling, Wood River, Ill., to Crown Central Petroleum Corp., Balto., Md.

Process refining sulfur-containing mineral oils containing organic disulfides, by reducing the disulfides to mercaptans with a reducing agent, extracting sulfur bodies and impurities with anhydrous liquid ammonia. No. 1,974,725. Ludwig Rosenstein, San Francisco, Cal., to Shell Development Co., San Francisco, Cal.

Process refining mineral oils; extracting sulfur bodies and other impurities from the oil with anhydrous liquid ammonia. No. 1,974,724. Ludwig Rosenstein, San Francisco, Cal., to Shell Development Co., San Francisco, Cal.

Apparatus for cataiyzing oil. No. 1,974,722. Rene Oppenheim, Gennevilliers, France, to Societe Anonyme Le Carbone, Gennevilliers, France.

Apparatus for distilling crude oil and other liquids. No. 1,974,701. Geo. W. T. Beck, Cody, Wyo.

Process cracking hydrocarbon oil. No. 1,974,683. Nikolaus Mayer, Vienna, Austria, fifty-four per cent. to Alfred Oberle, Washington, D. C.

Process removing stearin and other relatively high melting substances from fatty oils by diluting oil under pressure to retain the gases in liquefied condition. No. 1,974,542. Geo. L. Parkhurst, Chicago, Ill., and Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Method solvent refining hydrocarbon oil. No. 1,973,683. Marcus T. Kendall, Long Beach, Cal., to Texas Co., New York, N. Y.

Process for viscous lubricating oil normally unstable as to color formation on storage, containing as color formation inhibitor, an aliphatic amine. No. 1,973,676. Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Process refining lubricating oil by treating oil with concentrated sulfuric acid. No. 1,973,621. Francis X. Govers, Vincennes, Ind., to Indian Refining Co., Lawrenceville, Ill.

Production solid lubricant consisting of a paraffin base cylinder stock, sodium stearate, free alkali, and water. No. 1,973,537. Chas. A. Miller and Chas. B. Karns, Franklin, Pa., to Valvoline Oil Co., Cincinnati, O.

Treatment hydrocarbon oils; subjecting said distillate to reaction in presence of a compound containing a halogen. No. 1,973,499. Jacque C. Morrell, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Process cracking hydrocarbon oils. No. 1,973,498. Jacque C. Morrell and Gustav Egloff, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Process oxidized motor fuel. No. 1,973,475. Carleton Ellis, Montclair, N. J., to Ellis-Foster Co., Montclair, N. J.

Production anti-knock compounds. No. 1,973,474. Gustav Egloff and Raymond E. Schaad, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Process for conversion of hydrocarbon oils. No. 1,973,471. Nicholas G. de Rachat, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Apparatus for inhibiting the oxidation and dilution of crank case oils. No. 1,973,384. Clarke C. Minter, East Orange, N. J.

Method and apparatus for treatment hydrocarbons. No. 1,973,294. Erik Mutter, New Brighton, N. Y., to Standard Oil Development Co., Bayways, N. J.

Manufacture petroleum lubricating oils. No. 1,973,119. Carey Forbes Spencer, Houston, Tex., to Sinclair Refining Co., New York, N. Y.

Manufacture lubricating oils. No. 1,973,118. Carey Forbes Spencer, Houston, Tex., to Sinclair Refining Co., New York, N. Y.

Method hydrogenation of oils. No. 1,972,948. Donald E. Payne, Chicago, Ill., to Standard Oil Co. (Indiana), Chicago, Ill.

Treatment hydrocarbon oils and coal. No. 1,972,944. Jacque C. Morrell, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Treatment hydrocarbon oils. No. 1,972,936. Jacob Benjamin Heid, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Treatment hydrocarbon gases. No. 1,972,926. Gustav Egloff, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Treatment hydrocarbon oils. No. 1,972,914. Chas. H. Angell, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Gum inhibitor for hydrocarbon fuels. No. 1,972,760. Wm. S. Calcott, Pennsgrove, N. J., and Ira E. Lee, Wilmington, Del., to Gasoline Antioxidant Co., Wilmington, Del.

Method dehydrating oil. No. 1,972,454. Robt. E. Manley and Albert F. Knoss, Beacon, N. Y., to The Texas Co., New York, N. Y.

Method cracking oils in vapor phase. No. 1,972,149. Percy C. Keith, Jr., Bernardsville, N. J., to Gasoline Products Co., Inc., Del.

Company Booklets

C270. Bakelite Corp., 247 Park ave., N. Y. City. Did you know that Bakelite Corp. makes approximately 2,000 varied products? October *Bakelite Review* will give you a very splendid cross-section picture of many of the more important. Interesting, in view of the recent Morro Castle disaster, are the many and novel suggested uses for plastics in shipbuilding. This department will gladly arrange for you to receive this magazine regularly.

C271. J. T. Baker Chemical Co., Phillipsburg, N. J. The *Chemist-Analyst* (issued monthly) admirably fills a very unique need in the chemical literature. Methods of analyses, tested short-cuts in analytical work find a publication medium here. No analytical chemist or research worker should fail to see that a copy is regularly received. This department can arrange this.

C272. Carbide & Carbon Chemicals Corp., 30 E. 42 st., N. Y. City. The booklet *Synthetic Organic Chemicals* has long past reached that stage where it needs an introduction or an explanation of its completeness and authoritative background. New edition gives properties, specifications and uses of 70 synthetic organic chemicals. Ten years ago most of them were laboratory curiosities; today 30 are shipped in tank cars. Thirty-five additional compounds are described that were not in the last edition. For example, you will be interested in reading about synthetic Ethanol, a time-honored product made in a new way; three new hexyl alcohols finding uses in protective coatings and pharmaceutical intermediates; and octyl alcohol, another compound hitherto not available industrially. Not only are there more alcohols included in this issue, but many new ethers, aldehydes, ketones, esters, amines and members of other chemical families are described.

C273. New Industries Division, Union Gas & Electric Co., Cincinnati, Ohio. A most complete and comprehensive survey of the Cincinnati area entitled: "Chemical Opportunities of the Cincinnati Area." Company executives in chemical and allied fields will do well to send for this study.

C274. Commercial Solvents Corp., Terre Haute, Ind. *Alcohol Talks* for October deals with definitions. This highly interesting series should be read by all users of industrial alcohols.

C275. E. I. du Pont de Nemours & Co., R. & H. Division, Wilmington, Del., or any branch office. Quarterly price list is ready. Chemical buyers find this an indispensable aid in keeping abreast of market quotations.

C276. Eastman Kodak Co., Rochester, N. Y. *Synthetic Organic Chemicals* for October contains an interesting article on the subject of types of valence.

C277. Givaudan-Delawanna, Inc., 80 5 ave., N. Y. City. *The Givaudanian*, a monthly house organ, is distributed free to all those who use or could use chemical means of imparting pleasant odors to their products.

C278. Glyco Products Co., 949 Broadway, N. Y. City. Glyceryl mono stearate, glyceryl mono ricinoleate and similar products, now standard and available commercially, are fully described in an attractive new booklet.

C279. Grasselli Chemical Co., Cleveland, Ohio. A new leaflet describes the means of controlling the peach borer with paradichlorbenzene.

C280. R. W. Greeff & Co., 10 E. 40 st., N. Y. City. This well-known and important company, importers and exporters, and manufacturers' agents for a large number of important domestic chemical manufacturers, issues a completely revised list of products that no buyer of industrial and pharmaceutical chemicals should fail to obtain.

C281. W. A. Hammond, Yellow Springs, Ohio. New booklet describes in intimate detail a new patented dessicant "Dri-er-ite." It is technically described as anhydrous calcium sulfate. Some 12 advantages are listed. It is suggested not only as a dessicant for all laboratory purposes but in industrial processes of solvent recovery, drying organic liquids, drying of anhydrous liquids, and in air conditioning. Complete details are contained in the booklet and plant superintendents and consultants, as well as analytical and research chemists, will find it worth sending for.

C282. D. W. Haering & Co., 3408 W. Monroe st., Chicago, water specialists, are now publishing *H-O-H News*, a house organ devoted to presentation of news and personnel items in the scale and corrosion control and proportioning fields. News concerning recent scientific developments in these fields and reviews of leading articles in publications which may be of interest to those directly connected with this type of work are covered in each issue.

C283. Mallinckrodt Chemical Wks., St. Louis, Mo. The October price list.

C284. Merck & Co., Rahway, N. J. The October price list.

C285. Merck & Co., Rahway, N. J. This department was particularly interested in the article "Scientific Packaging of Fine Chemicals" in the October issue of *The Merck Report*.

C286. Monsanto Chemical Co., St. Louis. "How Monsanto Serves" graphically illustrates how Monsanto products serve directly or indirectly in the home, office, plant, etc. In addition, there is the story of the development of the Monsanto Company. This latest brochure is quite in keeping with the well-known Monsanto standard of beautifully done advertising matter.

C287. Monsanto Chemical Co., St. Louis. *Monsanto Current Events* for September features an article on "Organic Chemicals Play Essential Roles in Manufacture of Rubber Products" by John W. Thomas, President, Firestone Tire & Rubber Co.

C288. National Aniline & Chemical Co., 40 Rector st., N. Y. City. *Dyestuffs* is a quarterly and is devoted to summarizing leading articles in the textile, tanning and other fields where dyes are used.

C289. Philadelphia Quartz Co., 121 S. 3rd st., Philadelphia. P's & Q's for October deals with silicate coatings in welding practices.

C290. Synthane Corp., Oakes, Pa. From the standpoint of attractive format and interesting typographical arrangement this new booklet is an excellent example of fine industrial literature. It describes thoroughly the various grades of Bakelite laminated sheets, rods, tubes, and fabricated parts produced by Synthane. Actual samples of the various products described are contained within its pages.

C291. R. T. Vanderbilt Co., 230 Park ave., N. Y. City. *The Vanderbilt News* for September-October is devoted largely to a technical discussion of "Darvan, A New Dispersing Material for Use in Latex Compounding."

Chemical Industries,
25 Spruce Street,
New York City.

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Company Booklets—Nov.

ADVERTISING PAGES REMOVED

Chemical Production

A digest of plant management, design, equipment and containers for the makers of chemicals

Capitalizing the Research Function

By E. V. Moncrieff

The abiding assignment of any company that produces an industrial commodity is anticipation—and successful solution—of new problems of its customers. No industry realizes the truth of this statement more fully than organizations catering to industry's lubrication needs. I might add that probably no oil company is more cognizant of this fact than our own company, which is now entering its 82nd year of service to industry. Our conclusion, born of years of experience in serving industries of every type, is this: Ability to anticipate and meet industry's requirements is in direct ratio to the quality of a company's research work.

Our long span of experience had its beginnings some six years before the completion of the famous Drake well near Titusville, Pa., Aug. 29, 1859. Size of today's research assignment may be gauged by comparing the 25-barrels-a-day capacity of the Drake well and the 2,500,000 barrel-a-day production that is today's performance in the U. S.

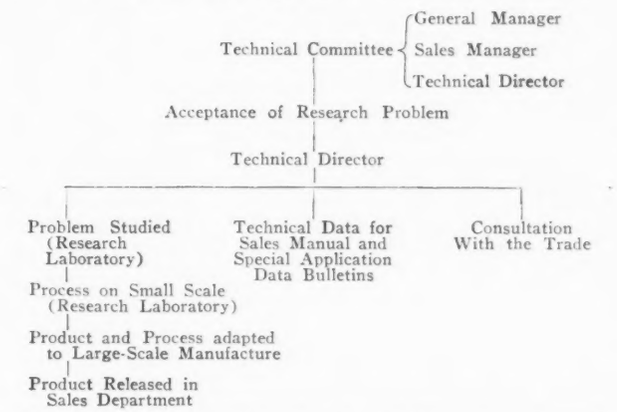
In those days, of course, we had no research laboratories. Demand of industry were comparatively simple; industry had not entered the swift procession that is its modern charactertistic. The research policy that is now basic was represented by practical men both in our manufacturing and sales departments who were cooperating with the steady growth of industry.

Our present-day research men derive helpful inspiration from the questing spirit of a certain greasemaker who was in our employ during the early 'nineties. Any story of Swan-Finch research work that failed to refer to him would be incomplete. This man—Hermann T. Boedicker—had years of practical experience in the making of greases and soaps. He developed a positive mania for experimenting with combinations of raw materials in a small experimental kettle, all the time keeping a watchful eye on his large process kettles. He seemed to acquire a sixth sense and produced, literally, thousands of workable combinations. He knew few, if any, of the chemical laws operating in such processes; still, he could produce, after a brief discussion with one of our lubricating engineers, the exact lubricant wanted in the form required. Although he had no one to whom to turn for technical help, our records show him to be the originator of certain products and processes that we use today.

But for all his mysterious skill, I believe that Hermann T. Boedicker, were he now alive, would be baffled by some of the problems that modern mechanical engineering presents to a manufacturer of lubricants. But the practical background of which he is so representative has undoubtedly evolved our present organized policy.

Technical progress is so revolutionary today that processes become obsolete very rapidly. Economic trends and competition force us to keep abreast of the times. This demands close cooperation between our sales and manufacturing departments. In short, our important questions are: How does our sales department gauge the needs of customers and prospects; can our research department produce the needed lubricant; can our manufacturing department make it on a production basis?

To carry on the kind of research work that is needed in successfully pursuing such a program, we have coordinated our activities under the scope of the following flow sheet:


Technical Committee
General Manager
Sales Manager
Technical Director
Acceptance of Research Problem
Technical Director
Problem Studied (Research Laboratory)
Process on Small Scale (Research Laboratory)
Product and Process adapted to Large-Scale Manufacture
Product Released in Sales Department
Technical Data for Sales Manual and Special Application Data Bulletins
Consultation With the Trade

The successful operation of a plan of this nature depends, to a great extent, upon the ability and equipment of individuals. Our plants are supervised by men—of chemical training. But before they are given plant responsibility they work in our sales department. Under the supervision of the plant superintendents we have testing laboratories, the assignment of which is to test incoming materials and outgoing products. Routine analytical work is part of their assignment. Even from these routine laboratories we often receive a surprise package in the form of a new product or process.

Our sales engineers are the most prolific source of research questions. From their points of vantage in the field, they encounter many new problems. Customers ask for assistance in devising lubrication schemes for new products they are marketing. Others want to improve lubrication of production equipment; still others wish to overcome problems inci-

dental to lubrication. Questions arising in this manner usually are directed to our technical research committee. The sales engineers present them to the home office on the form reproduced below, which we have found effective in obtaining information necessary to the preliminary charting of problems.

SPECIAL PROBLEM REPORT QUESTIONNAIRE

Date Mailed..... Date Received, N. Y. O.....

(1) From .....
(NAME OF CONCERN)

(2) Town .....
(3) Business of concern contacted .....
(4) Product made by concern .....
(5) Nature of problem .....
(6) What is expected or desired? .....
.....
(7) How are they now handling problem? .....
.....
(8) Is it satisfactory? .....
(9) Whose product used? .....
(10) How is material applied at present? .....
.....
(11) How many other firms have this problem? .....
.....

IMPORTANCE RATING

The development of lubricants for new applications is a major objective of our research work. But there are many interesting assignments not directly related to this objective.

Another important function of our research work is the investigation and adjustment of occasional important complaints. As an example, let me cite a recent one from our records. A textile mill—a new customer of ours—was having difficulty with wastage due to oil spots. With the cooperation of our research division and the permission of the mills, our engineers made a careful survey of the situation. The findings proved that the lubricant was blameless and that the condition was due to improper maintenance of line shaft bearings. These conclusions were demonstrated to the customer, he made the necessary changes and remains on our books a satisfied customer.

No less constructive from the sales angle are the occasional surveys made by our sales engineers, on the properties of plants. Their recommendations, in which they are aided by consultation with our research laboratories, have been the source of much new business for our company. The work is conducted in as disinterested a manner as possible, the recommendations are backed by the experience of the company and the resources of the research department. A recent survey of this nature resulted in the selling of a customer who had been impervious to all other approaches for a number of years.

The findings of our research workers in such actual surveys as well as those of a more academic and general nature are not permitted to repose in our files. They are broadcast to our sales engineers throughout the country through the medium of our "Technical Bulletins," issued when available material demands. Further, we publish a confidential house organ for our sales engineers, "The Swan-Finch News." This is issued every month. It contains technical news of a nature calculated to assist our men in solving problems encountered in the field, to enable them to present new ideas to their customers. In addition, it sets forth in complete detail such problems as I have outlined in preceding paragraphs.

Through these media, the work of our research groups—as well as the ideas of our individual sales engineers—are regularly made available to every man in our field force. Through them, the growing body of facts as developed by our laboratories in the course of their constant onslaughts on the lubrication problems associated with ever-increasing speeds and loads is disseminated to our sales engineers, and through them, to industry in general. E. V. Moncrieff, president Swan-Finch Oil Co., in Executive Service Bulletin, Metropolitan Life Insurance Co., September.

Patents—Naval Stores

Process refining wood rosin; distilling same under an absolute pressure not greater than 6 mm. of mercury, and isolating an intermediate fraction. No. 1,973,172. Henry R. Lee, So. Milwaukee, Wis., to Newport Industries, Inc., Pensacola, Fla.

Patents—Fertilizers

Preparation peat for fertilizer use; adding to air dried peat dust during its manufacture powdered water soluble fertilizing salt. No. 1,974,877. Richard Schubert, Bremen, Germany.

Process manufacture ammonium sulfate. No. 1,973,892. Fred Denig, Pittsburgh, to Koppers Co. of Delaware, Pittsburgh, Pa.

Patents—Explosives

Extraction diphenylamine from smokeless powder by comminuting the powder and washing it at room temperature in one or more baths of a mixture of acetone and water. No. 1,972,891. Wm. T. Ingraham, Dover, N. J.

Preparation explosive coating; composition of an inorganic explosive salt coated with a composition at least in part of pentaerythritol tetranitrate. No. 1,972,938. Norman G. Johnson and Harold A. Lewis, Woodbury, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

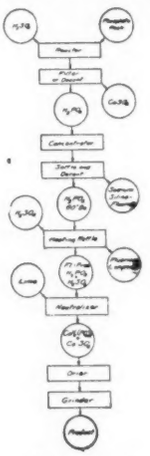
Extraction diphenylamine from smokeless powder, by comminuting the powder and washing it at room temperature in one or more baths of a mixture of acetic acid and water. No. 1,972,892. Wm. T. Ingraham, Dover, N. J.

Heavy Chemicals

New Source of Fluorine

Fluorine has been obtained by Prof. C. Mathers of Indiana University and P. T. Stroup of the Aluminum Co. of America by the electrolysis of caesium acid fluoride, using a Mathers cell constructed of magnesium. The caesium acid fluoride has a lower melting point, and can be more easily regenerated than the usual potassium acid fluoride electrolyte.

Removing Fluorine From Phosphoric Acid



Flowsheet

A patented process of removing fluorine from crude phosphoric acid comprises adding to the phosphoric acid sulfuric acid in an amount of from 10% to 60% of the P_2O_5 content of the phosphoric acid and heating at a temperature over 170° C. but below a temperature at which a substantial amount of pyrophosphoric acid is formed to remove fluorine. The patent number is U. S. No. 1,972,196, taken out by Eldon L. Larison, of Anaconda, Mont. A flowsheet which accompanied the patent description in the Patent Gazette is given, showing the exact steps to be taken to effect the elimination of the fluorine, formerly a very troublesome element in phosphoric acid, and phosphate production.

Eliminating Iron

A recently patented process (U. S. Patent No. 1,974,180) of eliminating iron from sulfate solution consists in neutralizing the solution if acid, and treating it with dehydrated alunite to bring about a base exchange reaction between the ferric oxide component of the ferric sulfate and the alumina component of the alunite.

Gas Masks—HCN Antidotes

Chemiker-Zeitung, Sept. 29, suggests disinfection of gas masks with barium peroxide and formalin. Same paper, same issue, contains detailed investigation, by Wirth and Mammerhirt, of 4 recently proposed antidotes for hydrocyanic acid poisoning; 1. sodium tetrathionate; 2. methylene blue; 3. sodium nitrate; 4. amyl nitrate. In animal experiments, preliminary treatment with any of these products slowed down toxic action of subsequently inhaled gas, but sodium tetrathionate and sodium nitrite were most effective followed by amyl nitrate and methylene blue. Where no preliminary treatment was given, inhaling of

non-toxic doses was best counteracted by methylene blue and amyl nitrate. None were effective after the administering of a lethal dose.

Oxalic Acid Production

New process for the production of oxalic acid from corncobs, developed in the laboratories of the engineering experiment station of Iowa State College, Ames, under direction of Dr. H. A. Webber of the chemical engineering staff, is announced.

Process involves production of oxalic by treating corncobs with nitrated acid and by fusing corncobs and oat hulls with caustic soda. Cost data prepared by Dr. Webber indicate a possibility of commercializing the process.

Between 6,000,000 and 8,000,000 lbs. of oxalic are used annually in the U. S., according to Dr. Webber. It is used in laundries, in the production of celluloid and rayon, in the purification of glycerol and stearin, in leather manufacture, in tanning, in calico printing, in bleaching straw and wax, and in the manufacture of ink and dyes.

Patents—Industrial Chemicals and Apparatus

Method esterification of diethyl-malonic acid. Heating a mixture of the acid and a monohydric aliphatic alcohol in presence of a neutral organic water-soluble solvent forming an azeotropic mixture with water. No. 1,974,917. Paul Halbig and Felix Kaufler, Munich, Germany, to Dr. Alex. Wacker Gesellschaft fur Elektrochemische Industrie, G.m.b.H., Munich, Germany.

Process gelatinized corn starch product; product forming an adhesive paste when mixed with water, and having a water absorption capacity of approximately 10. No. 1,974,915. Fred. O. Giesecke, Evanston, Ill. to International Patents Development Co., Wilmington, Del.

Process roasting iron sulfide ores containing other sulfides, such as copper and zinc, for recovery of the iron in the form of iron oxides and the other metals in the form of sulfates. No. 1,974,886. Kenneth Wm. Young, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., London, England.

Froth flotation oxidized ores; subjecting ore pulp to flotation operation in presence of reaction product of an organic amino compound, alcohol, and ammonia, with sulfur and phosphorus. No. 1,974,885. Geo. H. Wigton, Eureka, Utah.

Manufacture organic acid chlorides having a hydrocarbon nucleus which comprises causing chlorine to react with a mixture of phosphorus trichloride and an organic acid anhydride corresponding to said acid chloride. No. 1,974,845. Erik Clemmensen and Roy M. Miller, St. Louis, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Apparatus and process for production sulfuric anhydride from a mixture of substantially dry gases containing sulfur dioxide and oxygen. No. 1,974,829. Myles Standish Maxim, Somerville, Mass., to Merrimac Chemical Co., Inc., Everett, Mass.

Apparatus for production of combustible gas from solid fuel. No. 1,974,373. Chas. Whitfield, Acton, London, England.

Dry glue product having a large surface ratio in the form of a string-like unit. No. 1,974,228. David Abernethy, Omaha, Nebr.

Production artificial lumber. No. 1,974,227. Geo. Witty, Long Island City, N. Y., one-half to Otto J. Kalt, New York, N. Y.

Differential separation of complex sulfide ores; inhibiting one or more of the sulfides with zinc cyanide, and adding ammonia to dissolve film from surface of one of the inhibited sulfides, then using froth-flotation treatment. No. 1,974,218. Jos. P. Ruth, Jr., Denver, Colo., to Ruth Co., Denver, Colo.

Method eliminating iron from sulfate solutions by treatment with dehydrated alunite. No. 1,974,180. Arthur Fleischer, Salt Lake City, Utah, to Kalunite Co., Delaware.

Production of an adherent patina upon copper or its alloys, by applying an electrolyte embodying a concentration of sodium bicarbonate, then subjecting to electrolysis with the copper or copper alloy forming the anode. No. 1,974,140. Clarence E. Irion and Geo. L. Craig, Columbus, O., to Battelle Memorial Institute, Columbus, O.

Process for producing substantially dry ethyl ether from ethyl ether water solutions. No. 1,974,069. Paul S. Greer, Charleston, W. Va., to Carbide & Carbon Chemicals Corp., New York, N. Y.

Process and apparatus for separation of gaseous mixtures. No. 1,974,065. Mathias Frankl, Augsburg, Germany, to American Oxythermic Corp., New York, N. Y.

Process production base-exchange material, the particles of which are surrounded and permeated with an organic binding material. No. 1,974,010. Carl Christian Leopold Gether Budde, Copenhagen, Denmark.

Method stabilizing bituminous emulsions by adding bile salts to a preformed emulsion. No. 1,973,991. Claude L. McKesson and Lyndon G. Thompson, Oakland, and Walter D. Buckley, Berkeley, Cal., to American Bitumuls Co., San Francisco, Cal.

Wettable powder consisting of sulfur and 1 to 3 gms. of sulfite liquor solids and 5 to 8 c.c. lime-sulfur per 100 gms. of sulfur. No. 1,973,910. Paul D. Peterson, Ligonier, Pa., to Koppers Co. of Delaware, Pittsburgh, Pa.

Process manufacture refractory bricks from chrome ore. No. 1,973,907. Elisabeth Lux, Essen-Ruhr, Germany, to Koppers Co. of Delaware, Pittsburgh, Pa.

Apparatus for carrying out chemical reactions in periodically heated chambers. No. 1,973,851. Paul Feiler, Ludwigshafen-am-Rhine, Hermann Weigmann, Mannheim, and Gerhard Hirschberg, Ludwigshafen-am-Rhine, Germany, to I. G. Frankfort-am-Main, Germany.

Process for purification of crude acetylene derived from a thermal treatment of a gas composed of hydrocarbons. No. 1,973,840. Friedrich Zobel and Hans Reich, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Refining crude paraffin wax by contacting crude wax in the liquid state with hydrogen in the presence of a finely divided catalyst comprising molybdenum oxide and chromium oxide. No. 1,973,833. Rudolf Wietzel, deceased, late of Ludwigshafen-am-Rhine, by Else Wietzel, administratrix, Wilhelmshorst, Germany, and Conrad Pfaundler, Oppau, Germany, to Standard-I. G. Co., Linden, N. J.

Method purification vegetable oils; mixing in with oil suitable amount of phosphoric acid to react with the impurities and glycerides in the oil to produce free fatty acid. No. 1,973,790. Leo F. Appleton, Cleveland, O., to Sherwin-Williams Co., Cleveland, O.

Chemical laboratory apparatus—a pressure filling burette. No. 1,973,755. Wm. O. Geyer, Bloomfield, N. J.

Chemical laboratory apparatus—a three-way stop cock. No. 1,973,754. Wm. O. Geyer, Bloomfield, N. J.

Preparation paraffin emulsion of unsaponifiable aliphatic thermoplastic hydrocarbon and Montan wax in water. No. 1,973,692. Hubert L. Becher, Trenton, N. J., to Bennett, Inc., Cambridge, Mass.

Production cold molded abrasive article formed from mixture of a powdered synthetic resin and abrasive grains, having their surfaces previously moistened with a resin solvent. No. 19,318. Reissue. Harry C. Martin, Niagara Falls, N. Y., to Carborundum Co., Niagara Falls, N. Y.

Method production solid CO_2 from dried flue gases containing about 10% CO_2 and 90% nitrogen. No. 1,974,791. Jos. S. Belt, Amarillo, Tex., and Hamilton P. Cady, Lawrence, Kans., to J. S. Belt Natural Resource Corp., Phoenix, Ariz.

Manufacture arsenic acid; reacting between arsenious oxide and nitric acid in the presence of an iodine catalyst. No. 1,974,747. Jas. N. Latimer, Grand Junction, Colo., to Latimer-Goodwin Chemical Co., Grand Junction, Colo.

Method of parting chemically treated emulsions. No. 1,974,693. Chas. J. Robinson, Claremont, Cal., to L. Blake-Smith, San Francisco, Cal.

Process resolving an oil-water emulsion in which water is the dispersed phase. No. 1,974,692. Chas. J. Robinson, Claremont, Cal., to L. Blake-Smith, San Francisco, Cal.

Apparatus for production of liquid and solid carbon dioxide. No. 1,974,681. Guido Maiuri, Aldwych, London, England, to Maiuri Refrigeration Patents, Ltd., Aldwych, London, England.

Process for electron emission increasing coating containing the mixtures of barium carbonate with a glycol. No. 1,974,608. Eugene A. Giard, Shorewood, Wis., to Cutler-Hammer, Inc., Milwaukee, Wis.

Process producing heavy metal and alkali-earth metal salts of naphthenic acids. No. 1,974,507. Franz Pohl, Ludwingshafen-am-Rhine, and Bernhard Isenbeck, Frankfort-am-Main, Schwanheim, Germany, to I. G., Frankfort-am-Main, Germany.

Process for obtaining a finely divided carbonaceous product by oxidizing a raw carbonaceous material by means of nitric acid. No. 1,974,481. Geo. Antonoff, Croissy sur Seine, and Jean Freedland, Paris, France.

Apparatus for producing blocks of carbon dioxide snow by use of liquid CO_2. No. 1,974,478. Guglielmo Weber, Pergine Valdarno, Italy.

Method treating fibrous material having an eradicable imprintation suitable for use as a covering for edible products. No. 19,325. Reissue. Leo A. Goodman, Brooklyn, N. Y.

Process of low temperature nitration of liquid aliphatic dihydroxy and polyhydroxy compounds of the glycol and glycerine class. No. 1,973,559. Bruce K. Brown, Wilmette, Ill., to Standard Oil Co., Chicago, Ill.

Method froth flotation ore separation; grinding ore in water, conditioning the ore pulp by subjection to the action of an oxygen containing gas. No. 1,973,558. Frederic A. Brinker, Denver, Colo.

Production of an accelerated gypsum cement by mixing finely divided crystalline precipitated calcium sulfate with a relatively small amount of plaster of Paris in small amount of water. No. 1,973,473. Robt. S. Edwards, Milton, Mass., to Rumford Chemical Works, Rumford, R. I.

Recovery phosphates from minerals. No. 1,973,439. Arthur J. Mason, Homewood, Ill., Continental Illinois National Bank & Trust Co. of Chicago, executor of said Arthur J. Mason, deceased.

Process manufacture a fused amorphous ceramic composition. No. 1,973,408. Thos. S. Curtis, Huntington Park, Cal., to Vitrefax Corp., Huntington Park, Cal.

Process conditioning hydrated crystalline materials. No. 1,973,407. Edwin Cowles, Sewaren, N. J., to Electric Smelting & Aluminum Co., Sewaren, N. J.

Method impregnating wood by coating with a water soluble impregnating substance in pasty form. No. 1,973,394. Carl Schmittutz, Bad-Kissingen, Germany.

Processing glycerin lyes; first neutralizing with muriatic acid, precipitating the fatty acid by adding sodium aluminate, separating precipitated soap, finally recovering and separating glycerin and sodium chloride. No. 1,973,380. John J. Hely, Jr., Newton, Mass., to Merrimac Chemical Co., Inc., Everett, Mass.

Anti-knock composition containing in solution a mixture of uranium and vanadium chlorides. No. 1,973,320. Arnold Pacyna, Lyndhurst, N. J.

Froth control in ore flotation; subjecting mineral in form of a pulp to froth flotation operation in presence of an ethyl xanthate and a higher alcohol xanthate. No. 1,973,278. Lyle M. Barker, Orel E. Young, and Oliver C. Ralston, Clarkdale, Ariz., to United Verde Copper Co., Clarkdale, Ariz.

Preparation solutions of silica from siliceous residues; treating residues with hot solution sodium carbonate. No. 1,973,211. Alfred Kirkham, Manchester, England, to Peter Spence & Sons, Ltd., Manchester, England.

Process fluorination aliphatic compounds; reacting silicon tetrafluoride and a halogenated aliphatic hydrocarbon in the presence of a fluorination catalyst. No. 1,973,069. Albert L. Henne, Columbus, Ohio, to General Motors Corp., Detroit, Mich.

Manufacture rubber-like masses from butadiene hydrocarbons and polymerizable nitriles. No. 1,973,000. Erich Konrad, Leverkusen and Eduard Tschunkur, Cologne-Mulheim, Germany, to I. G. F., Frankfort-am-Main, Germany.

Coating composition suitable for white baking enamels. No. 1,972,905. Israel Rosenblum, Jackson Heights, N. Y.

Process purification alcoholic mixtures. No. 1,972,887. Crawford Hallock Greenewalt, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Treatment gases containing sulfur vapor. No. 1,972,885. Geo. H. Gleason, Montclair, N. J., and Alfred C. Loonam, Brooklyn, N. Y., to Guggenheim Bros., New York, N. Y.

Method recovery sulfur. No. 1,972,884. Geo. H. Gleason, Montclair, N. J., and Alfred C. Loonam, Brooklyn, N. Y., to Guggenheim Bros., New York, N. Y.

Method recovering elemental sulfur. No. 1,972,883. Geo. H. Gleason, Montclair, N. J., and Alfred C. Loonam, Brooklyn, N. Y., to Guggenheim Bros., New York, N. Y.

Production stable heat transfer medium consisting of a mixture of diphenyl oxide, naphthalene, diphenyl, said mixture having a freezing point around 5.7° C. No. 1,972,847. Max M. Levine and Herbert J. Krase, Anniston, Ala., to Swann Research, Inc., Birmingham, Ala.

Continuous process for making carbureted water gas. No. 1,972,833. Philip Subkow, Los Angeles, Cal.

Production mixed oil gas and water gas. No. 1,972,804. Harutyun

G. Terzian, Phila., Pa., to United Gas Improvement Co., Phila., Pa.

Apparatus for liquefying solid CO_2. No. 1,972,771. Walter S. Haid, Tulsa, Okla., and Philip A. H. Terrell, Washington, D. C.

Preparation di-diphenyl oxides by reacting a halodiphenyl with an aqueous solution of an alkali metal base. No. 1,972,605. Wesley C. Stoesser, and Robt. F. Marschner, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Manufacture carboxylic acid esters of 2-ethyl-butanol-1. No. 1,972,579. Jacob N. Wickert, Charleston, W. Va., to Carbide & Carbon Chemicals Corp., New York, N. Y.

Improved process production phenylstearic acid. No. 1,972,568. Ralph H. McKee, New York, and Henry B. Faber, Brooklyn, N. Y.

Non-porous vacuum and pressure tubing, by use of an impregnating coating of oil and gasoline resisting compound, an outer covering of cellulosic lacquer carrying a fraction of castor oil to keep it flexible. No. 1,972,523. Jos. A. Kennedy, Pawtucket, R. I., to Anaconda Wire & Cable Co., New York, N. Y.

Production acetaldehyde and acetic acid from acetylene, water vapor and oxygen by passing said gaseous mixture over a hydration catalyst non-volatile under the conditions of the reaction while heating. No. 1,972,476. Ernst Eberhardt, Ludwigshafen-am-Rhine, Germany, to I.G.F., Frankfort-am-Main, Germany.

Process manufacture nitriles, by reacting hydrocyanic acid on an oxazolidine. No. 1,972,465. Heinrich Ulrich and Karl Saurwein, Ludwigshafen-am-Rhine, to I.G.F., Frankfort-am-Main, Germany.

Process re-esterification of natural waxes. No. 1,972,459. Wilhelm Pungs, Ludwigshafen-am-Rhine, and Helmuth Freytag, Mannheim, Germany, to I.G.F., Frankfort-am-Main, Germany.

Method making finely divided powders. No. 1,972,447. Russell L. Jenkins and Theo. W. Schilb, Anniston, Ala., to Swann Research, Inc., Birmingham, Ala.

Conversion unhydrated acid aluminum silicates into base-exchanging compounds by superficial activation. No. 1,972,419. Robt. Griessbach, Wolfen, near Bitterfield, Germany, to I. G. F., Frankfort-am-Main, Germany.

Method preparation mixed gases and of combustion thereof. No. 1,972,259. Herman A. Brassert, Chicago, Ill., to H. A. Brassert & Co., Chicago, Ill.

Process producing dense CO_2 snow directly from liquid CO_2. No. 1,972,240. Hans Rufener and Theophil Eichmann, Bern-Liebefeld, Switzerland, to Georges B. Scarlett, Kennett Square, Pa., and Jas. W. Brock, Newton, Mass.

Removal fluorine from crude phosphoric acid. No. 1,972,196. Eldon L. Larison, Anaconda, Mont.

Production discharge effects on textiles, by impregnating textiles with a substantially non-volatile substance having an acid reaction; drying same prior to application of discharge agent. No. 1,972,137. Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, Del.

Precipitation tungstic oxide; treating a soluble alkali metal tungstate compound with hydrochloric acid whose HCl content is no geater than about 26%. No. 1,972,136. Frank H. Driggs, Bloomfield, N. J., to Westinghouse Lamp Co., East Pittsburgh, Pa.

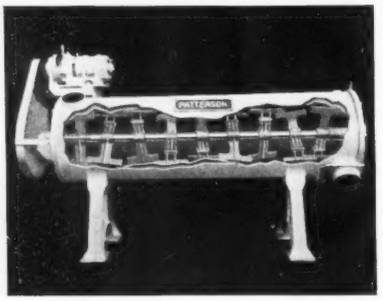
Process separation SO_2 from gaseous mixtures by bringing gaseous mixture into intimate contact with mixture of quinoline and water, and a diluent medium miscible with quinoline sulfite. No. 1,972,074. Maitland C. Boswell, Toronto, Ont., Canada.

Treatment Chinawood oil to produce a liquid ungelled oil. No. 19,307. Reissue. Floyd M. Reece, So. Bend, Ind., to O'Brien Varnish Co., So. Bend, Ind.

New Equipment

A monthly digest of new equipment of interest to the chemical and process industries.

A new mixer, particularly well-adapted for fine chemicals, colors, prepared foods, in short in any operation where purity and contamination are of utmost importance, is equipped with large inlet and discharge openings, built of plain or stainless steel and finished in attractive white enamel. Stirrer, driven through a silent gearless reduction unit and enclosed roller chain, runs in oilless bearings to prevent possible oil contamination, and is equipped with a series of double arm blades, one end of blade fitted with a spring loaded scraper and the other end shaped to move the material toward the discharge end. **QC 178**

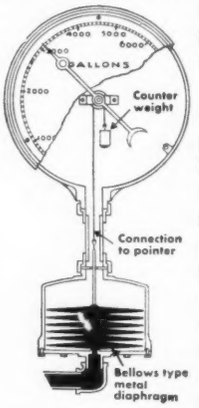


Neon Safety Fuses

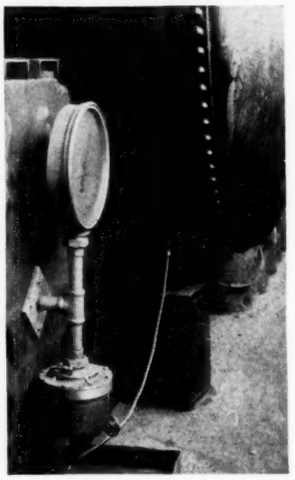
"Tattelites" is the name of a new line of safety neon potential fuses and testers, to either indicate, or discharge to ground, dangerous potentials before they become high enough to cause a spark or produce a body shock. Such potentials often gather on machinery, metal tanks and bins, etc., due to running belts, rubbing parts, dust and induction from nearby tranmission lines. They are a frequent cause of dust and vapor explosions. Another use for Tattelites is in testing for live wires, since they glow when brought near a live line and, by the intensity, indicate the approximate voltage. **QC 179**

Liquid Gauge

An interesting new type of liquid gauge is on the market. Gauge has been undergoing field tests for past 2 years and a number of very successful installations have been made in various types of industrial plants for measurement of liquids used in process work.



Accompanying diagram shows hydrostatic principle of operation of the gauge. Liquid in the tank is connected by means of copper tubing to a bellows type, metal diaphragm which is linked mechanically to the indicator of the gauge. As the tank is filled the diaphragm expands, linkage moves the indicator and reading on the dial shows exact quantity in terms of gallons, pounds, barrels, inches, or any other desired unit. Measurement is based on pressure and therefore on weight. This means that the gauge may be calibrated to show correct volume at any specified temperature. Where liquid is under vapor pressure, it is possible to compensate for this pressure by connecting diaphragm housing with the top of tank containing the liquid, by means of copper tubing. These gauges are built to measure liquids in tanks ranging in capacity from 300 gals. to 3,200,000 gals. Practically any type of liquid can be measured with this gauge except liquids that tend to form a solid mass when standing, or those that attack the phosphor bronze diaphragm. Where liquid to be measured changes in volume with changes in temperature, gauge is calibrated at some definite temperature. **QC 180**



Separating Solids and Liquids

New and original flow handling methods are disclosed in the latest addition to a well-known line of water purification equipment. The "Super-Settler" provides every facility for assisting in rapid separation of solids and liquids, and is a radical departure from present methods of handling sedimentation problems in the water and industrial waste treatment fields.

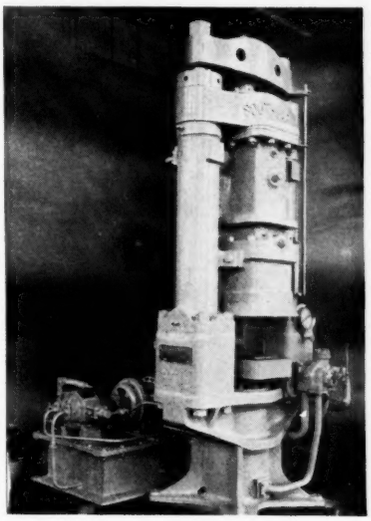
In addition to providing means for rapid and positive sludge removal, the "Super-Settler" design is based on the accurate control of the various flows and accelerated handling of the liquid. Maximum utilization of the tank volume is obtained by automatic control over every portion of the entire tank. Settling area can be increased to any desired capacity without changing the length of flow of the material.

The "Super-Settler," it is said, requires space approximately one-third the volume required by present day settling basins equipped with sludge removal mechanisms. This is made possible by positive control of the various factors which affect sedimentation, such as: flow control of both sludge and liquid, shallow settling depths, rapid evacuation of the material after separation has taken place, velocity of

flow, short circuiting, etc. Another exclusive feature of particular advantage is that the entire sludge removal mechanism may be lifted out and later put back into the tank without stopping the flow through the apparatus. **QC 181**

Dry Ice Press

A recent development is a type of hydraulic press necessary to the manufacture of solid carbon dioxide, commonly called "Dry Ice." Manufacture requires means of compacting the "snow" so that the ratio of the volume to the surface area may be vastly increased. By this method the "snow" is induced to remain in solid form for any serviceable length of time when exposed to atmospheric pressure and to normal temperature. Presses are entirely self-contained having a 2 pressure hydraulic power supply built into a unit which may be mounted on the press or at some convenient point nearby. Advantages listed are: (a) No hydraulic cylinder above the "snow" chamber and, therefore, no chance of oil entering the chamber and discoloring the product; (b) Extremely rigid construction, operating section of the machine being 2 rigid castings securely bolted together; (c) Only 3 stuffing boxes and these outside packed; (d) Low head room and all working parts within easy reach; (e) Compression head on the upper ram is integral with same and will not drop off into the "snow" chamber. **QC 182**



And, Summarized Briefly

Spotting freight cars can be quickly and economically done by a new electric car spotter that has several new innovations to recommend it. **QC 183**

While not a piece of new equipment "I-Heal-U", a new healing ointment for burns and cyanide sores, is mentioned. **QC 184**

New machine has one unit for vacuum cleaning and filling of bottles. Special efficiency and economy benefits are stressed in the literature. **QC 185**

A New England company is supplying valve indicators which can be attached to any kind of standard valve. Valve handle is removed and indicator installed in its place. Glance at indicator tells at all times position of valve. **QC 186**

Chemical specialty manufacturers should be interested in a new patented type of carton which can be resealed by the consumer by means of a small fold under flap after the primary glue-sealed flap has been opened. A better preserved product in your consumers' hand is promised. **QC 187**

Chemical Industries,
25 Spruce Street,
New York City.

I would like to receive more detailed information on the following: (Kindly check those desired.)

QC 178	QC 183
" 179	" 184
" 180	" 185
" 181	" 186
" 182	" 187

Name .....
Title .....
Address .....

Equip. Nov.

Patents—Fine Chemicals

Preparation octoic acid derivatives of phenols; a phenol containing a beta-ethylhexyl group. No. 1,974,821. Lucas P. Kyrides, St. Louis, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Method obtaining photographic films by use of diazonium compounds. No. 1,973,788. Roelof Jan Hendrik Alink and Jan Hendrik de Boer, Eindhoven, Netherlands, to N. V. Philips, Gloeilampenfabrieken, Eindhoven, Netherlands.

Process for a neutral polyglycol ester of a phenoxy acetic acid. No. 1,974,810. Michael N. Dvornikoff, St. Louis, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Production unsaturated ketones. No. 1,974,727. Erwin Schwenk, Berlin-Charlottenburg, and Erich Borgwardt, Berlin-Pankow, Germany, to Schering-Kahlbaum, A.G., Berlin, Germany.

Production 3.5 diacetoxy mercuri-4-nitroguaiacol. No. 1,974,506. Edgar A. Peterson, Denver, Colo.

Preparation pectin; thin coherent porous film of dry pectin, having such an attenuated structure that when immersed in water, the water has immediate access to all portions of the mass. No. 1,973,614. Wm. W. Cowgill, Fairfield, Conn., to Sardik, Inc., Jersey City, N. J.

Preparation pectin; applying liquid pectin, containing glycerine, to a drying surface in a thin layer, continuously removing film from surface with a solvent. No. 1,973,613. Wm. W. Cowgill, Fairfield, Conn., to Sardik, Inc., Jersey City, N. J.

Manufacture and recovery of glutamic acid. No. 1,973,574. Albert E. Marshall, New York, N. Y., to Larrowe-Suzuki Co., Rossford, O.

Process purification of methyl-para-amino phenol. No. 1,973,472. Arthur W. M. Dickins and Chas. R. Fordyce, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Process for photographic emulsion containing thiazolocarbocyanine dyes. No. 1,973,462. Leslie G. S. Brooker, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Condensation product of amino-substituted arseno compounds. No. 1,973,023. Karl Streitwolf, Frankfort-am-Main, Alfred Fehrle, Bad Soden-am-Taunus, and Paul Fritzsche and Walter Herrmann, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., New York, N. Y.

Preparation quinoline-8-azo compounds of the quinine series. No. 1,972,988. Gustav Giemsa and Manfred Oesterlin, Hamburg, and Bruno Putzer, Wuppertal-Elberfeld, Germany, to Winthrop Chemical Co., Inc., New York, N. Y.

Production unsymmetrical benzanthronyl selenides, having the general formula R_1-Se-R_2. No. 1,972,960. Robt. Frazer Thompson, Ian Blohm Anderson, and Sidney Thornley, Grangemouth, Scotland, to Imperial Chemical Industries, Ltd., London, England.

Method forming aliphatic derivatives of aromatic compounds. No. 1,972,956. Geo. W. Seymour, Cumberland, Md., to Celanese Corp. of America. Del.

Preparation of a stable, non-fermenting, water-containing emulsion of vegetable lecithin. No. 1,972,764. Friedrich Wm. Engelmann, Hamburg, Germany, to Harburger Oelwerke Brinckman und Mergell, Harburg-Wilhelmsburg, Germany.

Process recovering halogens; the step in recovery of iodine comprising heating an adsorbent agent containing a substantially non-volatile iodine-containing substance to remove organic impurities. No. 1,972,546. Harry E. Bierbaum, Long Beach, Cal., to General Salt Co., Los Angeles, Cal.

Preparation lactones; the step in preparing gluconic acid lactone which comprises heating a solution of gluconic acid with a glycol ether. No. 1,972,340. Edw. L. Helwig and Geo. M. Wiedeman, Bristol, Pa., to Rohm & Haas Co., Phila., Pa.

Method producing photographically printed fibrous product. No. 1,972,323. Dmitry Alexis Shiraeff and Ferdinand Jacobs, New York, N. Y.

Process for producing pure whites and a pure yellow in screened photographic pictures. No. 1,972,310. Franz Hubert Muller, Dusseldorf, Germany, to Durkoppwerke Aktiengesellschaft, Bielefeld, Germany.

Manufacture quinazoline compounds. No. 1,972,270. Giacomo Maffei, Milan, Italy, to S. A. Ledoga Prodotti Chimici e Farmaceutici, Milan, Italy.

Plant Maintenance

Important Precautions Often Neglected

There are a number of simple and well-known points in connection with chemical plant fittings and accessories which make all the difference between efficient working on the one hand, and trouble and disappointment on the other.

As regards mercurial thermometers, see that they are properly adjusted for stem error, and check works thermometers against an accurate ordinary chemical thermometer at regular intervals. Do not use mercurial thermometers in vessels made of aluminum or brass in case they get broken. Distant-reading thermometers operating a pointer on a dial by pressure are as a rule very reliable, at any rate for a considerable time, but after they have been in use for a long time they should be regularly checked against another thermometer which is known to be correct. Electric resistance thermometers, when correctly calibrated, are very accurate and reliable, and with anything like reasonable treatment they have much to recommend them, but make sure that the calibration is correct in the first instance.

Thermo-couples, correctly installed, are most useful, in fact indispensable, for higher temperatures, but these need considerable care in the way they are fitted up. It is essen-

tial, if correct readings are to be obtained, that the cold junctions should be always at the right temperature, and that the compensating leads should be of the right resistance. These points are often overlooked when pyrometers are changed from one part of the plant to the other. Occasional tests should be made with a salt bath or other source of known temperature to make sure that the readings are correct. Indicating and recording instruments should be kept well away from furnaces or the expansion of metal parts due to the heat may cause errors in readings. If instruments must be near furnaces a screen may be interposed to protect them from heat.

Pressure and vacuum gauges are on the whole very reliable, but they do sometimes get out of order and it is just as well during every overhaul of the plant to check them against a standard instrument. A gauge-testing outfit should be available in all but the very smallest chemical factories.

Flow meters for liquids and gases should be calibrated at intervals when an opportunity offers, though it must be admitted that it is often difficult and troublesome to arrange for doing this. Still, it is worth while taking some trouble in order to avoid being misled by false readings.

Main points in connection with fitting of new safety valves are that they should be of ample area and that actual valve and seat should be made of a material not liable to corrode under conditions of service. In use, care should be taken to see that they blow off at the proper pressure, and once a week or once a month test should be made by easing up weight or spring to make sure that valve has not stuck and is working freely. It is very important that all closed vessels in which steam or other easily condensable vapor is used should be provided with vacuum-release valves of ample area. If cold water is run into such a vessel when full of vapor, condensation is extremely rapid and, unless release valve is amply big, air may not get in quickly enough to pervent collapse of the vessel or its cover.

Simple, But Most Useful

A simple and very useful safety device on tanks and other vessels containing liquid chemicals is provision on outlet pipe of a seating and plug worked from the top of the tank by a guided rod. If outlet cock or valve leaks, sticks, or breaks, plug can be quickly dropped and serious loss or liquid possibly involving damage or danger can be avoided, and repairs to he cock or valve can always be carried out without first having to empty the vessel. This is a very old device, going back to long before the days of modern chemical engineering, but it is not used as often as it might be in chemical plants.

On some plants a host of automatic safety devices, usually electrically operated, are to be found showing by a sound or light signal when limit maximum or minimum temperature, pressures, liquid levels, and so on, have been reached. These are quite useful up to a certain point, but a word of warning must be issued in connection with them. Men get to depend on these signals and consequently pay less attention to its correct operation. Result is that, should the automatic signal fail to operate for any reason, and the best of them do fail sometimes, the men may fail to notice that abnormal conditions have arisen. If you have these devices do not assume that they are in working order, but have them tested once a day.

Every cock should have a properly fitting key with which to turn it. Use of spanners and Stillson wrenches soon ruins the square on the plug. A little lubrication is essential to the easy working of cocks; if grease is removed by the chemicals there is always graphite. This point is of special importance with stoneware cocks which are apt to stick, and which will not stand rough usage to loosen. Occasional grinding in of the plug involves very little trouble and ensures tightness against leakage and easy working. Same applies to valves of the screw-down type. Writer prefers gate valves either of the parallel or wedge pattern for most chemical liquids, especially corrosive ones.

A simple valve-grinding equipment is a very useful adjunct to the repair shop. Worn and corroded valves and cocks are often thrown on the scrap heap when they could easily be given a new lease of life, hence reconditioning of valves and cocks should be a regular feature of maintenance work. Renewable valves, seats, and gates are valuable features which facilitate this work.

Inadequate attention is very often paid to the design and arrangement of heating and cooling coils 2 mistakes being frequently made. First, is making coils too long in proportion to their bore. For every size of tube there is a limit of length, dependent on the velocity of flow inside and outside the coil, beyond which no further useful heat transmission takes place. This applies equally, of course, to heaters, coolers and condensers of the straight tube type, and when velocities are high it is surprising how short the maximum effective length is; somewhere about 2 feet, for instance, with a ½ in. tube.

Other mistake is that of placing the turns of the coil too close together and too much in line with each other, so that one turn shields the next. Plain cylindrical or helical coil is still used more than any other type, but it is by no means always the best. For the heating of a vessel with closed steam, the external tubular heater, with steam round the tubes and circulation of the liquid to be heated through the tubes, has several advantages. Circulation through the tubes is rapid and heating consequently efficient, and, if a valve is provided on liquid inlet to the bottom of the heater, latter can be quickly detached for repairs without opening up or emptying the vessel.

Another useful type of heating coil is the hairpin coil with horizontal tubes attached to a steam chest, which is bolted to the flange of a large rectangular tubulure on the lower part of the vessel. This type of coil can be withdrawn for repairs or cleaning far more quickly than the cylindrical coil, which has to be lifted out of the vessel after removing the cover.

With regard to portable lifting tackle the best policy is to buy only first-class material, and afterwards to see that it is kept in first-class order; it should also be kept in a place where it can be found when wanted. Cheap chain blocks, for instance, which jamb on every occasion, lead to much loss of time and temper, to say nothing of the risk of accidents. Riggers should be provided with a proper room or shed in which all portable lifting tackle, including slings and jacks, can be kept in orderly fashion, and it should be made an inviolable rule that all tackle after use on a job should at once be returned to this store and should be overhauled and greased where necessary ready for the next job. Do not forget that crane and other lifting chains should be annealed and tested at regular intervals. Never allow ropes or rope tackle to get wet, if it can possibly be avoided. Ladders for general use in the factory may conveniently be kept in the riggers' store, so that they can be found when wanted.—*Chemical Age* (British). Sept. 29.

Patents—Coal Tar Chemicals

Production anthraquinone derivatives. No. 1,974,866. Hermann Hauser, Basel, and Max Bommer, Rieben, near Basel, Switzerland, to Society of Chemical Industry in Basel, Basel, Switzerland.

Process for purification phenolic liquors and recovering values therefrom. No. 1,974,000. Oliver M. Urbain, Columbus, O., to Chas. H. Lewis, Harpster, O.

Method manufacturing coke and gas from oil in a retort oven. No. 1,973,909. Gerald J. Nordmeyer, Nutley, N. J., to Koppers Co. of Delaware, Pittsburgh, Pa.

Process refining hydrocarbon oil. No. 1,973,901. John W. Ingram, Pittsburgh, Pa., to Koppers Co. of Delaware, Pittsburgh, Pa.

Process purifying hydrocarbon oil from sulfur contained as impurity in oil, by subjecting oil to contact with an aqueous solution of sodium carbonate and arsenous oxide. No. 1,973,895. Clarence W. Garrison, Ft. Wayne, Ind., to Koppers Co. of Delaware, Pittsburgh, Pa.

Process for production of amides of n-beta-hydroxyalkyl amino carboxylic acids. No. 1,973,860. Heinrich Ulrich and Karl Saurwein, Ludwigshafen-am-Rhine, Germay, to I. G., Frankfort-am-Main, Germany.

Compound of anthraquinone series containing selenium, said compound having in its formula the nuclear structure of 2.2'-dianthraquinonyl-selenide. No. 1,973,773. Melvin A. Perkins, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method inhibiting discoloration of aromatic amines and monohydric phenols; by incorporating at least one compound from class of hydrazine, hydrazine hydrate, a hydrazine salt of a weak acid and semicarbazide. No. 1,973,724. Ralph P. Perkins, Andrew J. Dietzler, and Edw. C. Burdick, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Process froth flotation in the presence of a product produced at a temperature not much above 100° C., by reaction of phosphorous sulfide with a tar acid. No. 1,974,704. Ira H. Derby and Orin D. Cunningham, Indianapolis, Ind., to Peter C. Reilly, Indianapolis, Ind.

Production amino acids from substances containing keratin by heating substances with alkaline strontium compounds and water. No. 1,974,554. Ernst Ziegler, Berlin-Wilmersdorf, Germany, to Catharina Weidner, Charlottenburg, near Berlin, Germany.

Preparation alkoxy-amino- and alkoxy-nitrocarbazoles. No. 1,974,518. Gerhard Schrader, Opladen, and Fritz Ballauf and Albert Schmelzer, Cologne-Mulheim, Germany, to General Aniline Works, Inc., New York, N. Y.

Dry composition useful preparation diazo-solutions consisting of a compound derived from an amine and an aldehyde. No. 1,973,148. Wm. E. Kemmerich, Nyack, N. Y.

Process for acid wool dyestuff of the anthra-quinone series. No. 1,973,025. Carl Taube, Leverkusen-am-Rhine, Ludwig Zeh, Wiesdorf-am-Rhine, and Josef Hilger, Cologne-Mulheim, Germany, to General Aniline Works, Inc., New York, N. Y.

Manufacture water insoluble azo dyestuffs. No. 1,973,013. Friedrich Muth, Leverkusen-I. G. Werk, and August Modersohn, Cologne-Mulheim, Germany, to General Aniline Works, Inc., New York, N. Y.

Manufacture substitution products of the carbazole sulfonic acids. No. 1,973,012. Friedrich Muth and Albert Schmelzer, Elberfeld, Germany, to General Aniline Works, New York, N. Y.

Process dehalogenation cyclic halogen compounds. No. 1,973,003. Max Albert Kunz, Mannheim, and Karl Koeberle, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, New York, N. Y.

Process preparing amino-anthraquinone sulfo-chlorides. No. 1,973,001. Georg Kranzlein, Frankfort-am-Main, Hans Schlichenmaier, Kelkheim in Taunus, and Ludwig Schornig, Frankfort-am-Main, Germany, to General Aniline Works, New York, N. Y.

Method production 1-mercapto-aryl-thiazoles. No. 1,972,963. Ira Williams, Woodstown, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method manufacture tertiary alkyl phenols; simultaneous preparation of a 4-tertiary-alkyl-phenol, a 2-tertiary-alkyl-phenol, and a 2, 4-di-tertiary-alkyl-phenol of the benzene series. No. 1,972,599. Ralph P. Perkins, Andrew J. Dietzler, and Jos. T. Lundquist, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Process tar distillation. No. 1,972,468. Jos. Zavertnik, Jr., Harrington Park, N. J., to The Barrett Co., New York, N. Y.

Process manufacture derivatives of amino-6-methyl-2-heptene-2. No. 1,972,450. Wilfrid Klavehn, Mannheim, Germany, to E. Bilhuber, Inc., Jersey City, N. J.

Compound of the carbazole group, prepared by reacting with an olefine upon a compound of the carbazole series in the presence of a catalytically acting metallic halide. No. 1,972,232. Richard Michel, Crefeld, Germany, to I. G. F., Frankfort-am-Main, Germany.

Preparation aromatic cyano-acetyl compound. No. 1,972,219. Wilhelm Eckert, Heinrich Sieber, and Heinrich Greune, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., New York, N. Y.

Producing carboxylic acid amides by condensing a carboxylic acid with an amine; the improvement effecting the condensation in the presence of aluminum chloride. No. 1,972,142. Richard Frank Goldstein, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Anthraquinone-acridone compound. No. 1,972,094. Robt. J. Goodrich and Ivan Gubelmann, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Highly halogenated anthraquinone-acridone compound. No. 1,972,093. Ivan Gubelmann and Robt. J. Goodrich, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Patents—Dyes

Preparation anthraquinone dyestuffs. No. 1,975,061. Norman Hulton Haddock, Frank Lodge, and Colin Henry Lumsden, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Process for manufacture vat dyestuffs of the benzanthrone acridine series. No. 1,973,787. Hugo Wolff, Mannheim-am-Rhine, Germany, to General Aniline Works, Inc., New York, N. Y.

Process color lakes, using calcium salt of Litho Red, about 2% its weight of urea-formaldehyde resin, and from 5 to 15% calcium rosinate. No. 1,974,510. Hans Reindel and Arthur Ohmer, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York, N. Y.

Manufacture azo dyestuffs containing sulfur, formed by coupling a diazotized aromatic amine having a hydroxy group in the ortho position with respect to the amino group with an azo component. No. 1,973,636. Robt. Lantz, Paris, France, one-half to Societe Anonyme des Matieres Colorantes & Products Chimiques de St. Denis, Paris, France.

Manufacture azo dyestuffs containing sulfur, resulting from the coupling of tetrazotized dithioaniline with two molecular proportions of methylphenylpyrazolone. No. 1,973,635. Robt. Lantz, Paris, France, one-half to Societe Anonyme des Matieres Colorantes & Produits Chimiques de St. Denis, Paris, France.

Preparation insoluble azo dyes. No. 1,972,873. Miles A. Dahlen, Wilmington, Del., and Martin E. Friedrich, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method making a permanent ink record by applying aniline dye with a fixing acid as a coloring matter. No. 1,972,313. Elsie M. Price, Swampscott, Mass.

Dyestuff of thioindigo series. No. 1,972,177. Franz Wieners, Opladen, Germany, to General Aniline Works, Inc., New York, N. Y.

Manufacture unsulfonated pyrazolone azo dyestuffs containing a phenolic hydroxyl group esterified with an organic carboxylic acid. No. 1,972,138. Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, Del.

Dyestuff anthraquinone-acridone series. No. 1,972,095. Ivan Gubelmann and Robt. J. Goodrich, So. Milwaukee, and Wm. Dettwyler, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Vat dyestuff of the dibenzanthrone series; heating a compound of the class of halogen substituted 2.2'-dibenzanthronyl and nitro substituted 2.2'-dibenzanthronyl, in the absence of added condensing agents. No. 1,974,817. David Clarence Rhys Jones, Ian Blohm Anderson, and Robt. Fraser Thomson, Grangemouth, Scotland, to Imperial Chemical Industries, Ltd., London, England.

Plant Operations

Disposing of Trade Wastes

Although trade wastes may be classified roughly according to specific industrial processes, such as silk dyeing or leather tanning, waste from each individual plant presents its own problem of disposal.

Adequate treatment of waste is an especial problem of textile mills. These have to get rid of used dye baths in many cases, as well as a variety of concentrated treating solutions such as boil-off liquors, mercerizing liquors and bleach solutions. In some cases a mill has only one of these types of waste to discharge into a stream, but in most plants a number of different operations are carried out and discharges from each department flow together in drains and enter stream as a mixture.

Waste which contains a large amount of organic matter may be treated with bacteria, so that it is digested and dissolved in the same way as in bacteria treatment of sewage. Dye wastes may be allowed to stand in contact with activated carbon for a time, which absorbs color so that waste liquor becomes substantially colorless and can run on into the stream without too noticeable an effect.

A very alkaline discharge may be treated with an acid to give a harmless, neutral solution, or an acid discharge may be treated with an alkali. Sometimes the discharges from different operations in a plant tend to neutralize each other when they are mixed. For instance, the waste from a "souring" operation, which is acid, will tend to neutralize the waste from a mercerizing bath, which is alkaline. Also, the waste bleach liquors from one department will help to lighten the color in the dye wastes from another department.

One method of treatment which has been found to be economical and to have wide application is coagulation of color and other impurities by formation of iron or aluminum hydroxide in the waste liquor.

Iron salt used is usually copperas and the aluminum salt alum, either of which is relatively cheap. Instead of sodium hydroxide, which would be too expensive on such a large scale, lime is used to give the same reaction.

Waste liquor is run into large tanks where the lime and either the copperas or the alum are added. The flocculent hydroxide precipitates out and as it settles down it carries the color, as well as any solid impurities, with it. Cleared layer of liquid on top is allowed to overflow and run into the stream, while sludge that settles on the bottom is removed at intervals.

In some districts this sludge may be discharged into the sewer system, but it is usually either filtered dry or spread out in the open to dry, and the dried cake disposed of on a dump filling. When mixed wastes are acid, an excess of lime is used for neutralizing before coagulation.

A typical example of a small plant recommended this method of treatment is one which does piece-dyeing and printing on silk, silk-and-cotton, silk-and-wool, rayon and cotton.

This plant carries out a number of operations besides the dyeing itself, including a boil-off treatment, bleaching and mercerizing. It therefore has a mixed discharge consisting of 100,000 gals. per day of exhausted dye solutions and wash water, 200,000 gals. per day of waste from the

boil-off and bleach department, and 10 to 20 gals. per day of very concentrated waste along with 500 gals. per day of wash water from the printing department.

Wastes from the boil-off and from print shop were so concentrated and so foul that these were diverted before they mixed with the other wastes and run into the sewer. The sewer in that particular locality was built to handle a small percentage of trade waste from the plants in the vicinity. The rest of the wastes were made to combine in such proportions that they would neutralize each other as far as possible.

This combined discharge was then made to enter a large basin from which it could be allowed to flow into the settling basin at a uniform rate. On its way from the averaging basin to the settling basin there was mixed into it hydrated ferrous sulfate at the rate of 4 lbs. to 1000 gals. of lime, also at the rate of 4 lbs. per 1000 gals.

Settling basin recommended has a capacity of 200,000 gals. Overflow from this went over a weir and was then suitable for discharge into the nearby stream. This is a continuous process, coagulation taking place all the time in the settling basin, and the sludge that forms on the bottom being removed at intervals.

In this particular plant the sludge could be disposed of in the sewer system. The cost of the chemicals required in this treatment came to a total of $13.80 a day, that is, 4.6c per 1000 gals. of waste.

Dr. Foster D. Snell, before Division of Water, Sewage & Sanitation, A.C.S., Cleveland Meeting.

The Literature

Articles of interest to the chemical and process industries particularly noted in a monthly review of the U. S. and foreign periodicals.

Coatings. "Synthetic Japanese Lacquers," *Synthetic and Applied Finishes,* (British) Oct., p99.

Foreign. "Some Czechoslovak Chemical Industries," by J. G. F. Druce. *The Manufacturing Chemist* (British) Sept., p297.

Glass. "Liberation of Fluorine in Fluoride Glass Manufacture," by Henry H. Blau and Alexander Silverman. *Industrial & Engineering Chemistry,* Oct., p1060.

Raw Materials. "Gypsum—From Mine to Market," by L. V. Robinson. The *Canadian Institute of Mining and Metallurgy,* p482.

Raw Materials. "Utilization of Alunite Through Alkali Fusion," by E. O. Huffman and F. K. Cameron. A discussion of method to utilize this raw material as a source of chemicals. *Industrial & Engineering Chemistry,* Oct., p1108.

Rubber. "Rubber as a Chemically Resistant Material, by Dr. D. F. Twiss. A treatise on the characteristics of rubber from the standpoint of its chemical resistance. *Rubber Age,* Oct., p17.

Safety. "Safety In The Chemical Industry," by J. Davidson Pratt, who emphasizes the need for safety measures. *Chemical Age* (British) Oct. 13, p331.

Safety. "Accident Prevention at Retsof," by T. F. Courthope. A canvass of a salt mine organization shows what safety measures are considered most effective. *The Explosives Engineer,* Sept., p254.

Soap. "Persulfate As A Soap Bleach," by Cyril S. Kimball, Harry J. Hosking, and Foster Dee Snell. *Industrial & Engineering Chemistry,* Oct., p1074.

Soy Bean. "Saga of the Soy," by J. C. McKown. A popular review of the domestic soy bean industry and the uses of the oil and cake and meal. *The Country Home,* Oct., p10.

Water Treatment. "Chlorination of Sewage," by William Rudolfs. This is the first in a series of articles dealing with sewage chlorination by Dr. Rudolfs and his staff. *Water Works and Sewerage,* Oct., p343.

Equipment Booklets

E256. Aluminum Co. of America, Pittsburgh, Pa. *Aluminum News Letter* presents monthly the outstanding advances in the uses of aluminum.

E257. Grasselli Chemical Co., Cleveland, Ohio. *Cadalyte Service Bulletin* for October describes plating equipment.

E258. The Guardite Corp., 37 W. Van Buren st., Chicago. Bulletin No. 28, a 32-page book, gives important data on insect infestation in foods and tobacco, and on methods of fumigation.

E259. International Filter Co., 59 E. Van Buren st., Chicago. A new booklet, profusely illustrated, describes the Super-Settler, designed to handle any sedimentation problem in the water or industrial waste treatment field.

E260. Johns-Manville, 22 E. 40th st., N. Y. City. An 80 page brochure "Insulation in the Chemical Industries" is said to be a guide-book to greater economies. Interesting text describes the insulation methods which have proved effective in reducing operating costs. Should be in the consulting library of every plant superintendent, consultant and works manager.

E261. Laboratory Glassware Corp., 482 N. 5th st., Philadelphia. A 31-page booklet on the "Delta" filter paper line. Each paper is described and the special uses for it given. It is rather surprising to the uninformed the large number of specialized filter papers that are reported. Every practicing chemist, plant superintendent will profit by consulting this book.

E262. LaMotte Chemical Products Co., McCormick Bldg., Baltimore, Md. Latest service bulletin deals with Part II of "The Significance of Periodic Soil Tests."

E263. Link-Belt Co., 910 S. Michigan ave., Chicago. *Link-Belt News* is a monthly newspaper reporting the latest Link-Belt contributions in the conveying and power transmitting machinery field.

E264. Link-Belt Co., 910 S. Michigan ave., Chicago. Booklet 1415 describes Herringbone gear speed reducers.

E265. Lovejoy Tool Wks., Chicago. A new 2-page leaflet gives engineering data on flexible couplings.

E266. Locke Insulator Corp., Baltimore, Md. A brief presentation in question and answer form of some of the factors which must be taken into consideration if the best and most economical results are to be obtained in grinding mills.

E267. N. J. Zinc Co., 160 Front st., N. Y. City. A reprint of an article which appeared in *Automotive Industries* "Research Points Way to Improved Methods of Chrome-Plating."

E268. Pulmosan Safety Equipment Corp., 176 Johnson st., Brooklyn, N. Y. Bulletin No. 1F deals with the complete line of stationary and portable fire-fighting apparatus.

E269. Raymond Bros. Impact Pulverizer Co., 1302 N. Branch st., Chicago. A new 6-page leaflet describes new flexibility in fineness control with Raymond Roller Mills. The patented Whizzer, used in the Raymond Mechanical Air Separator is now applied to the Raymond Roller Mill.

E270. Republic Steel Corp., Massillon, Ohio. "Thumbs Down on Rust" is a graphical presentation of a wide variety of uses of Toncan Iron in the war on rust.

E271. Roots-Connersville Blower Corp., Connersville, Ind. Bulletin 50-B11 is devoted to new high duty Connersville vacuum pumps. Many improvements are claimed by the manufacturer, including accessible roller bearings, improved lubrication, gears and bearings fully protected, herringbone gears, and elimination of stuffing box attention.

E272. Roots-Connersville Blower Corp., Connersville, Ind. Bulletin 22:23-B10 illustrates and describes the standard and heavy duty types of blowers.

E273. Sprout, Waldron & Co., Muncy, Pa. Bulletin A-534 describes roller mills which can be used for grinding aluminum hydrate, Bakelite, bauxite, clay, sodium bicarbonate, casein, chalk, color pigments, soy beans, etc.

E274. Sprout, Waldron & Co., Muncy, Pa. Bulletin E-133 describes stone burr mills adapted for fine pulverizing and for products of a very hard or abrasive nature.

E275. Sprout, Waldron & Co., Muncy, Pa. Bulletin F-832 illustrates a complete line of mixers of standard horizontal, vertical, batch and continuous types.

E276. Sprout, Waldron & Co., Muncy, Pa. Bulletin G-1 tells the story of screw conveyers, G-2 of bucket elevators, G-3 of belt conveyers.

E277. Surface Combustion Corp., Toledo, Ohio. This month's folder is descriptive of SC special furnaces in the steel industry.

E278. U. S. Bottlers Machinery Co., 4009 N. Rockwell st., Chicago. A new catalog explains essentials of complete water purification, needs for and how to accomplish it, illustrating and describing proper equipment for any desired capacities and all necessary installation and operation data.

E279. U. S. Electrical Manufacturing Co., 1510 Western ave., Chicago. New bulletin describes construction and several improvements of geared reductions in electrical motors.

E280. Worthington Pump & Machinery Corp., Harrison, N. J. Worthington centrifugal pumps, 2-stage volute, type UB.

E281. Worthington Pump & Machinery Corp., Harrison, N. J. Worthington gas engines, vertical 4-cycle, type CG.

CONTAINERS

E282. A H-Q-RA Co., 495 6th ave., N. Y. City. A new leaflet describes a patented bottle cap that delivers a measured dose automatically.

E283. Anchor Cap & Closure Corp., Long Island City. Latest leaflet shows by diagram just how the Anchor Amerseal cap works.

E284. Carpenter Container Co., Bush Terminal, Brooklyn, N. Y. A new leaflet describes advantages of Carpenter drums and lists the various industries where they can profitably be used.

E285. Chase Bag Co., 250 W. 57th st., N. Y. City. ***Bagology*** has a breezy style all of its own. Readers enjoy its editorial contents. To become a regular subscriber the only requisite is to be a user of bags, cotton, burlap or paper.

E286. Phoenix Metal Cap Co., Chicago. *The Flame* is a very attractive house organ that will keep buyers of caps well-informed of the latest innovations in closures.

Chemical Industries,
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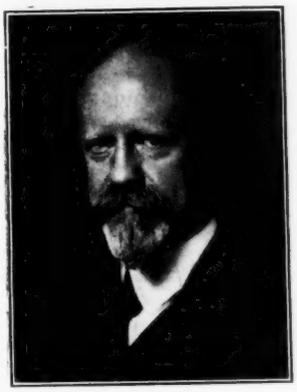
Equipment—Nov.

Chemical Markets & News

Chemical Alliance Meets in New York City—President William B. Bell Refutes Some Popular Fallacies—Francis P. Garvan Talks Informally on Trade Agreements—Officers Elected

Chemical Alliance's first annual meeting, held at the Waldorf in N. Y. City on Nov. 5, attracted a large number of the industry's leading executives eager to check results of 6 months operations under NRA.

William B. Bell, president of the Alliance, in delivering the President's address, spoke on the subject "The Road To Recovery." In particular, he stressed the achievements of American industry during its existence and pointed out the prejudice and antagonism being created today by the spread of doctrines which are both unsound and untrue. Turning from generalities to specific examples, Mr. Bell cited the following among others:



PRESIDENT WILLIAM B. BELL
Industry again calls for his leadership.

1. "That 2% of the population shared 80% of the national income." In replying to this, Mr. Bell pointed out that in reality only 60% of the population drew any income whatsoever and that the best figures obtainable showed that 60% of the persons sharing the national received 80% of the whole.

2. "That the workers' share of the national income has been steadily decreasing." Figures taken from the U. S. census show that employees compensation in 1850 was 38% of the total national income. That in '32 it was 80%. Mr. Bell further pointed out that American industry in the 2 years, '31-'32, had paid out to its workers over $2,500,000,000 more than the income produced by those industries.

3. "That many of the workers in industry had been robbed in order to pay interest and dividends on capacity over-expanded by greed." Mr. Bell showed that except in very few instances where developments have upset the normal demands for new capacity, there has been no real over-expansion of industry. At the present time, Mr. Bell further pointed out, including all industries and including obsolescent equipment in operating plants, there is no excessive over-capacity.

4. "That corporate profits increased faster than workers' wages." This the president of the Alliance declared is not true. He stressed the fact that corporate profits between '22 and '29 fluctuated around 4% with no rising trend. In no one year did they exceed 4 8-10%. Real wages (money wages related to cost of living) showed a consequently rising trend and an aggregate increase in '29 as compared with '22 of 16 8-10%.

Achievements of Business

Mr. Bell further pointed out the remarkable record of American industry in creating and maintaining the highest living standard for its workers of any country in the world. In matters relating to health, safety and general well-being of employees, the American workers were the envy of all other workers of the world, he reminded his audience. He further compared the American industrial system, based on sound economic policy, with that which would exist should there be established national economic planning with government control of all of our economic activities. He concluded that this would only result in the regulation of the individual activities of everyone engaged in production, and, as production is determined by consumption, it necessarily follows that the choice, quantities and kinds of goods used

Officers of the Chemical Alliance include William B. Bell, president, and, from left to right, Lammot du Pont, Charles Belknap, Willard H. Dow, vice-presidents; J. W. McLaughlin, treasurer; Warren N. Watson, M. C. A. secretary, is secretary of the Alliance. Dean Clark continues as code director.

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by consumers must also be regulated. Mr. Bell showed that this could only mean complete regimentation of individual activities; that national economic planning (as previously defined) can never succeed in a democracy; that the essence of democracy is freedom of choice, freedom to change—and that man's whole existance has shown that such centralized control as would be necessary is not possible except by such degree of coercion and compulsion as would be destructive of private enterprise and democratic institutions.

In conclusion, Mr. Bell urged that every member of the chemical industry should give serious thought to the problems facing all industry, and that the chemical industry should lead in an endeavor to see that scientific progress, so necessary to this industry and to our national life, should not in any way be blocked.

Luncheon Meeting

At the luncheon meeting an informal discussion took place among the members present of the various problems facing the industry today. Francis P. Garvan, president of the Chemical Foundation and a guest of the Alliance at the meeting, discussed "Trade Treaties From The Viewpoint of the Chemical Industry." Other speakers taking part in the discussion were Lammot du Pont, C. S. Ching, Charles Stone, E. M. Allen, John Garvin, H. L. Derby, H. M. Albright, Charles Belknap and others. Discussion covered the future of NRA, employment relations, and social security.

Code Director Reports

Code Director Dean Clark's report showed that through the splendid cooperation of several members in providing office facilities and other services, the cost of administering the code for 6 months amounted to approximately $12,000.

Election of Officers

In accordance with the provisions of the Alliance, at the meeting members elected a board of directors and the board of directors, in turn, elected its executive committee. The exeutive committee, in accordance with the Code of Fair Competition for the Chemical Industry, also serves as the Code Authority for the industry. Executive committee elected William B. Bell, president of the Alliance for the ensuing year; Lammot du Pont, Charles Belknap, and Willard H. Dow as vice-presidents; J. W. McLaughlin, treasurer; and Warren N. Watson, secretary.

Obituaries

J. Lawrence Gilson, 53, banker and chemist, well-known in chemical circles in the early twenties during his connection with du Pont, on Oct. 4.

Stuart Croasdale, 68, prominent in Western mining circles, on Oct. 1.

Henry Stein, 51, former Merck assistant treasurer, on Sept. 27.

Joseph R. Colby, 54, president and general manager of Liquid Carbonic, on Oct. 7.

William N. Toschach, 53, chief chemist for the A. & P. grocery chain for many years, on Oct. 16.

Dr. Samuel P. Mulliken, M.I.T. professor of organic chemistry and well-known for his important work during the World War, on Oct. 24.

Mrs. Ira Remson, widow of the internationally known chemist and former head of Johns Hopkins, on Oct. 31.

Aylmer A. Robinson, 37, Hercules Powder chief clerk at Wilmington headquarters, on Oct. 6. He was in the employ of Hercules for 20 years.

Associations

¶ A.C.S. Will Ballot for President-Elect —Safety Council Officials Named— Equipment Institute's Annual Meeting

Walter S. Landis, Cyanamid vice-president; Prof. Arthur J. Hill, chairman of the Dept. of Chemistry at Yale; Dean Frank C. Whitmore of the School of Chemistry and Physics, Pennsylvania State College; Dr. E. R. Weidlein, director of Mellon; A. S. Richardson, head of research for Procter & Gamble; Prof. W. D. Harkins of the University of Chicago; Prof. Edward Bartow, head of the Dept. of Chemistry and Chemical Engineering of the State University of Iowa, are 7 nationally known chemists nominated for president-elect of the A.C.S. Four names receiving largest vote in a mail ballot of the Society's members will go before the Council, governing body of the Society, for election. Winner will become president-elect on Jan. 1, '35, and president on Jan. 1, '36.

Prof. Roger Adams of the University of Illinois, now president-elect, becomes president on Jan. 1 next, succeeding Dr. Charles L. Reese.

Nominees for councillor-at-large were also announced as follows: A. C. Fieldner of Washington, chief engineer of the Experimental Stations Division, U. S. Bureau of Mines; Per K. Frolich, director of Standard Oil Development Co.; Prof. Ross A. Gortner, University of Minesota; Prof. Arthur E. Hill, New York University; Prof. B. S. Hopkins, University of Illinois; M. H. Ittner, Colgate-Palmolive-Peet; Prof. Alexander Silverman, University of Pittsburgh; Dr. M. X. Sullivan, Chemo-Medical Research Institute, Georgetown University; Prof. Hugh S. Taylor, Princeton University.

Will Work for Safety

A. L. Armstrong, Eastman Kodak, is general chairman of the executives committee of the chemical section of the National Safety Council. His associates are:—Vice-chairman in charge of program, H. L. Miner, duPont, Wilmington, Del.; vice-chairman in charge of engineering, C. L. Jones, Hercules Powder, Wilmington, Del.; secretary, Ralph O. Keefer, Aluminum Co. of America, Massena, N. Y.; news letter editor, E. L. Root, Celluloid Corp., Newark, N. J.; occupational disease committee chairman, Dr. Leonard Greenberg, of Yale Medical School, New Haven, Conn.; membership and publicity committee chairman, S. D. Kirkpatrick, *Chemical and Metallurgical Engineering,* New York; statistics committee chairman, R. C. Stratton, Travelers Insurance, Hartford, Conn.; members at large, F. E. Clancy, Jr., Mathieson Alkali, Niagara Falls, N. Y.; F. W. Dennis, Hooker Electrochemical, Niagara Falls, N. Y.; Ira V. Kepner, Penn. Salt, Menominee, Mich; E. F. King, Lever Brothers Co., Cambridge, Mass.; H. P. Lewis, duPont, Wilmington, Del.; John Roach, Deputy Commissioner of Labor, Trenton, N. J.; C. E. Sevrens, Merrimac Chemical, Boston; Plummer Wheeler, American Cyanamid, Linden, N. J.; S. E. Whiting, Liberty Mutual Insurance, Boston; Carl G. Wyder, Textile Dyeing & Printing Co. of America, Fairlawn, N. J.

Moul, Equipment Institute Head

James E. Moul, Turbo-Mixer Corp., N. Y. City, heads the Chemical Engineering Equipment Institute. Election was held at the 2nd annual meeting on Oct. 16 at the Chemists' Club in N. Y. City. Other officers elected include: Vice-presidents, H. D. Miles, Buffalo Foundry & Machine, Buffalo, N. Y., and William Edwin Hall, Duriron Co., New York; secretary-treasurer, D. H. Killeffer, 60 E. 42nd st., N. Y. City.

Institute also elected following to constitute, with Mr. Moul, Mr. Miles, and Mr. Hall, its board of directors: Samuel Alsop, Alsop Engineering; C. L.

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Campbell, E. B. Badger & Sons Co.; J. V. N. Dorr, Dorr Co.; Howard Farkas, U. S. Stoneware Co.; L. H. Harvison, M. W. Kellogg Co.; Percy C. Kingsbury, General Ceramics Co.; L. P. Sharples, Sharples Specialty Co.; S. F. Spangler, Chemical Construction Corp., and Arthur Wright, of Arthur Wright & Associates.

Code authority of the chemical engineering equipment industry (a subdivision of the machinery and allied products industry) was constituted of the directors as representatives of the Chemical Engineering Equipment Institute together with M. J. Sales, Independent Filter Press Co., Brooklyn, and Franklin Wedge, Electro-Chemical Supply & Engineering Co., Paoli, Pa., as representatives of those firms in the industry not members of the institute. Administration members of the code authority of the industry are Daniel L. Morris and Francis E. Lee. Mr. Moul was elected chairman, and Mr. Killeffer secretary of the code authority.

Salesmen To Ballot

Salesmen's Association of the American Chemical Industry is presented with the following slate for this year's election by the nominating committee: For president, John Alvarez, of Grasselli; vice-president, Jack Lepport, Columbia Alkali; secretary, Charles Lichtenberg, Commercial Solvents; treasurer, Walter Murphy, CHEMICAL INDUSTRIES; members of the executive board, Samuel Kline, Calco Chemical; Frank Byrne, Monsanto, and Fred Koch, Dow Chemical. The association has reduced number of vice-presidents from 3 to one and has separated the offices of secretary and treasurer. Election will be by mail vote.

Exterminators Name Raley

Thomas C. Raley, head of Getz Exterminators, St. Louis, is elected president of the National Association of Exterminators and Fumigators, at the recent convention in St. Louis.

A. C. S. "Doings"

Dr. Charles L. Reese, A.C.S. president, reviews history of du Pont chemical researches before Delaware Section on Oct. 17.

Prof. Charles A. Mann, Minnesota U. chemistry head, is guest speaker at October meeting of the Midland section; subject, "Organic Compounds as Inhibitors of Corrosion." Recently elected chairman of the Midland section is Dr. Howard S. Nutting, and W. M. Murch is secretary.

A.S.T.M. Committee Personnel

Officers of some of the more important A. S. T. M. Committees are given:

Committee D-17 on Naval Stores. (Organized, 1924; present membership, 19.) Chairman: F. P. Veitch, Chemist in Charge, Industrial-Farm Products Division, U. S. Bureau of Chemistry and Soils. Vice-Chairman: E. V. Romaine, Technical Director, General Naval Stores Co. Secretary: C. F. Speh, Secretary, Pine Institute of America.

Committee D-10 on Shipping Containers. (Organized, 1914; present membership, 20.) Chairman: J. A. Newlin, Chief, Section of Timber Mechanics, U. S. Forest Products Laboratory. Secretary: C. A. Plaskett, Senior Engineer, U. S. Forest Products Laboratory.

Committee D-11 on Rubber Products. (Organized, 1912; present membership, 79.) Chairman: H. A. Depew, Research Chemist, American Zinc Sales Co. Vice-Chairman: C. H. Zieme, Service Engineer, The Republic Rubber Co. Secretary: Arthur W. Carpenter, Manager of Testing Laboratories, The B. F. Goodrich Co.

Committee D-13 on Textile Materials. (Organized, 1914; present membership, 154.) Chairman: H. J. Ball, Professor of Textile Engineering, Lowell Textile Institute. Vice-Chairmen: B. H. Foster, Manager, Textile Section, United States Rubber Co.; J. M. Weaver, Sales Engineer, General Asbestos and Rubber Division of Raybestos-Manhattan, Inc. Secretary: W. H. Whitcomb.

Committee D-15 on Thermometers and Laboratory Glassware. (Organized, 1921; present membership, 22.) Chairman: W. H. Fulweiler, Chemical Engineer, United Gas Improvement Co. Secretary: C. S. Reeve, Manager, Research Development, The Barrett Co.

Committee D-1 on Preservative Coatings for Structural Materials. (Organized, 1902; present membership, 157.) Chairman: Allen Rogers, Supervisor, Course in Industrial Chemical Engineering, Pratt Institute. Vice-Chairman: C. S. Noal, Manager of Production, Paint and Varnish Dept., The Sherwin-Williams Co. Secretary: M. Rea Paul, Consulting Colorist, National Lead Co.

Committee D-2 on Petroleum Products and Lubricants. (Organized, 1904; present membership, 107.) Chairman: T. A. Boyd, Head, Fuel Section, Research Division, General Motors Corp. Vice-Chairman: T. G. Delbridge, Process Supervisor, The Atlantic Refining Co. Secretary: R. P. Anderson, Secretary, Division of Refining, American Petroleum Institute.

Committee C-7 on Lime. (Organized, 1912; present membership, 40.) Chairman: James R. Withrow, Professor of Chemical Engineering, Ohio State University. Vice-Chairmen: E. E. Eakins, Chemist; L. S. Wells, Chief, Lime and Gypsum Products Section, National Bureau of Standards. Secretary: Lee S. Trainer, Chief Engineer, Construction Dept., National Lime Assn.

Litigation

¶ General Chemical's Complaint Against Standard Phosphate & Acid Dismissed — Celluloid Sues Libby Owens—Singmaster's Petition Denied

General Chemical's complaint against Standard Phosphate & Acid, alleging infringement of Slama & Wolf patent, No. 1,371,004, for the oxidation of sulfur dioxide and the use of a catalyst in the manufacture of sulfuric, is dismissed by the U. S. District Court sitting in Baltimore. Opinion was rendered by Judge Coleman. Defendant filed a motion to dismiss bill of complaint on the ground that the patent was void because of unreasonable delay in filing a disclaimer as to claim 7, this claim having been held invalid as a result of previous litigation. Question whether this motion should be granted or overruled was the sole issue before the court.

Laminated Glass Patent

Celluloid, charging infringement of patent for method of manufacturing laminated glass and laminated glass products, filed suits in equity Oct. 24 against Libbey-Owens-Ford Glass of Todelo. Suit is filed in the District Court of the U. S. in Toledo through Edwards, Bower & Poole, of 63 Wall st., attorneys for Celluloid Corp. Complaint charges Libbey-Owens-Ford Glass with infringing U. S. Letters Patent 1,936,044 and asks that defendant be perpetually enjoined against further infringement, an accounting of profits, triple damages, and costs of the suit.

Delustering Rayon Pigments

James A. Singmaster's petition for a writ of certiorari in patent litigation instituted by N. J. Zinc against Singmaster and Tubize-Chatillon, denied by U. S. Supreme Court, Oct. 8. Litigation involved use of pigments for delustering rayon. A lower court's decision had awarded Singmaster 38 of the 40 patents contested.

Silica Gel Receivers Sustained

Silica Gel Corp. receivership is sustained by the Supreme Court of the U. S., which refused to interfere with the decision of the U. S. District Court at Baltimore. C. Wilbur Miller, former president of the company and other complainants had asked for a review of the action of the lower tribunal.

Foreign

¶ Germany Reopens Phosphate Mines —English Chemical Industry Improves

After being closed for 15 years German phosphate rock mines are being reopened to lessen country's dependency upon foreign markets.

Germany was the largest purchaser ing as early as 1868 but ceased operations when Florida phosphate deposits were discovered in '93. Mining was resumed in '15, to meet war demands, but discontinued following the war when foreign competition again made itself felt. German State Railway will assist mining companies with reduced freight rates, Dept. of Commerce report states.

Germany was the largest purchaser of American phosphate rock in '33, taking 155,000 tons, valued at $761,000, both totals being approximately double those of the preceding year. U. S. is world's largest producer and exporter of phosphate rock and competes in foreign markets with rock produced in northern Africa and Russia. Russia, formerly a small importer of phosphate rock, developed a considerable export business in '33, and is credited with supplying 9% of world total during that year. American shipments are

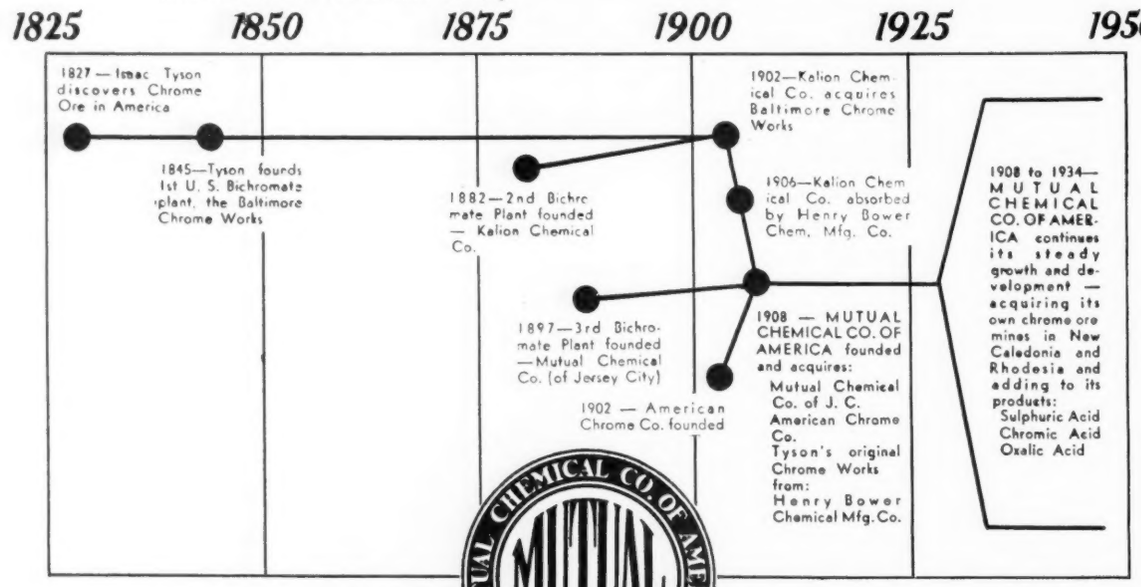
A Modern Idea
over 100 years Old

In 1827 Isaac Tyson recognized as Chrome Ore two heavy black stones he saw supporting a barrel on a Baltimore market dray. He traced the stones to their source, discovered a sizeable ore deposit, acquired the properties and through mining them, took the first step in the founding of a new industry in this country. For a number of years, the Ore was shipped to Europe for processing.

In 1845 he organized the Baltimore Chrome Works and built the first Bichromate plant in the new world.

The Mutual Chemical Co. of America has continued and developed Tyson's first venture, and one of their present plants,—the largest in the country,—occupies the site of Tyson's original Chrome Works in Baltimore.

The Mutual Chemical Co. or its antecedents have been intimately associated with every step in the development of Bichromate since Tyson's discerning eye discovered the presence of Chrome Ore in this country.


1825
1850
1875
1900
1925
1950
1827—Isaac Tyson discovers Chrome Ore in America
1845—Tyson founds 1st U. S. Bichromate plant, the Baltimore Chrome Works
1882—2nd Bichromate Plant founded — Kalion Chemical Co.
1897—3rd Bichromate Plant founded —Mutual Chemical Co. (of Jersey City)
1902 — American Chrome Co. founded
1902—Kalion Chemical Co. acquires Baltimore Chrome Works
1906—Kalion Chemical Co. absorbed by Henry Bower Chem. Mfg. Co.
1908 — MUTUAL CHEMICAL CO. OF AMERICA founded and acquires:
Mutual Chemical Co. of J. C.
American Chrome Co.
Tyson's original Chrome Works from:
Henry Bower Chemical Mfg. Co.
1908 to 1934—MUTUAL CHEMICAL CO. OF AMERICA continues its steady growth and development — acquiring its own chrome ore mines in New Caledonia and Rhodesia and adding to its products:
Sulphuric Acid
Chromic Acid
Oxalic Acid

Bichromate of Soda
Chromic Acid

Bichromate of Potash
Oxalic Acid

MUTUAL CHEMICAL CO. OF AMERICA
MUTUAL
NEW YORK, N.Y.

FACTORIES
Baltimore Jersey City

MINES
New Caledonia South Africa

The History of Mutual is the Chemical History of Chrome in America

consigned chiefly to European countries, though in recent years Japan has become an outstanding market. Exports of rock from the U. S. during '33 totalled 829,000 tons ($3,544,000), an increase of 35% in quantity and 27% in value compared with preceding year, when shipments were at low levels.

Export shipments have continued high since the beginning of '34, reaching 639,000 tons, valued at $3,173,500, during the first 8 months, an increase of 29% in quantity and 53% in value compared with the first 8 months of '33. For a detailed survey of the German trade situation see C. I. Oct., p. 341.

British Chemical Upturn

Board of Trade production index for chemicals and allied trades shows how improved chemical business is. Improvement of 12.7% (109.0 against 96.7) is reported for first quarter of '34 over '33; and an improvement of 8.4% (109.8 against 101.3) is reported for the second quarter.

Foreign Trade

¶ French Chemical Trade Declines—German Chemical Exporters Barter—U. S. and Japan's Chemical Trade With China—New Zealand Possibilities

French trade in chemicals and allied products registers a decided downward tendency in '34 while reports from most other countries indicate steady and marked improvements. Exports of such commodities from France during the first half of '33 decreased 8% to $45,570,000 compared with the corresponding period last year and imports, valued at $39,000,000, decreased 13%. Practically all countries, with the exception of Germany, Netherlands and the U. S., bought less French chemicals during '34 period. Shipments of some industrial chemicals and fertilizers made advances but foreign sales of prepared medicines, perfumery and toilet preparations declined more than 20%.

Practically all commodities and all countries shared alike in the lessened imports of France, outstanding exceptions being larger purchases of gums, resins, essential oils and coal tar pitch.

U. S., Germany, United Kingdom and Belgium in order named are chief foreign sources of French chemical and allied products imports.

Imports from the U. S. during the first half of the year were valued at $8,031,000, a decline of 9% compared with corresponding period of last year, while those from Germany declined 11% to $7,487,000. Receipts from United Kingdom declined only slightly to $5,661,000, but a decline of 14% to $4,717,000 was registered in purchases from Belgium, statistics show.

French imports of chemicals and allied products cover a very wide range, with the U. S. supplying oils, sulfur, coal tar products including dyes, soaps, and perfumes, and a long list of miscellaneous industrial chemicals.

German Barter

Acute shortage of foreign exchange is causing German chemical exporters to turn more and more to barter during recent months as a means of promoting export trade, according to a report from Consul Sydney B. Redecker, Frankfort-on-Main, made public by the Commerce Department's Chemical Division.

Barter has not only been of great assistance to exporters but has facilitated importation into Germany of needed raw and semi-manufactured materials, report states.

A number of barter exchange transactions involving the sale of chemicals and allied products have been consummated during the past 2 years, notable of which was the sale to Egypt of a large quantity of commercial fertilizer in exchange for Egyptian cotton, which transaction was handled by a consortium of interested firms in Bremen, Consul reports.

One large German chemical company recently concluded a number of transactions involving either the sale of its products or release of frozen assets resulting from previous sales, against the importation into Germany of foreign materials. One such transaction with Hungary resulted in the importation into Germany of Hungarian grain and other agricultural products.

Various other transactions of this general character are understood to have been concluded with countries in Central and Southeastern Europe, notably Bulgaria, where tobacco was taken by Germany in exchange for various German chemical products.

Trade With Balkans

Germany is particularly interested at this time in promoting cultivation of oil-seeds in Southeastern European countries for importation into Germany in exchange for German goods, including all manner of chemical and allied products such as fertilizers, medicinals and cosmetics. It is reported that an elaborate plan has been drawn up looking to the development of an extensive trade of this character with Bulgaria and, possibly, other Balkan countries.

Considerable attention has been given to extending relations with Turkey, and special arrangements have been made with Chile for the importation of a fixed quota of Chilean nitrate in exchange for German products and the release of frozen German credits in that country. It is reported that this transaction has thawed out approximately 10% of about 30,000,000 marks of German credits which have been frozen in Chile for some time.

China's Imports

Participation of both the U. S. and Japan in China's chemical import trade was greater in the first half of the current year than in the corresponding period of '33 while share of Germany in this trade declined.

China's imports of chemicals and allied products were valued at $16,500,000 during the first 6 months of '34, a decline of 14% compared with the corresponding period last year. Germany continued largest source of supply, accounting for 30% of the total compared with 34% last year, while the U. S. increased its share from 14 to 16% and that of Japan increased from 11 to 15%.

Substantial reductions in receipts of industrial chemicals, especially sulfuric acid, ammonium sulfate, bleaching

COMING EVENTS

American Bottlers of Carbonated Beverages, 106th Armory, Buffalo, N. Y., Nov. 12-16.

North Carolina Section, American Water Works Association, and North Carolina Sewage Works Association, Hotel Virginia Dare, Elizabeth City, N. C. Sec. M. F. Trice, Raleigh, N. C. Nov. 12-14.

American Petroleum Institute, Dallas, Tex., Nov. 12-15.

National Fertilizer Association, Southern Convention, Atlanta-Biltmore Hotel, Atlanta, Nov. 12-14.

American Institute of Chemical Engineers, fall meeting, Pittsburgh, Nov. 15-17.

Ohio Ceramic Industries Association, Lord Hall, Ohio State University, Columbus, Ohio, Nov. 16-17.

American Society of Mechanical Engineers, annual meeting, N. Y. City, Dec. 3.

Eleventh National Exposition of Power & Mechanical Engineering, Grand Central Palace, N. Y. City, Charles Roth, Manager, Dec. 3-8.

American Society of Refrigerating Engineers, Dec. 5-7, Hotel New Yorker. . . . . .

American Association of Textile Colorists & Chemists, annual meeting, N. Y. City, Dec. 7-8.

Ceramic Association of N. J., Ceramics Bldg., Rutgers, New Brunswick, N. J., Dec. 14.

American Association for The Advancement of Science, Schenley Hotel, Pittsburgh, Dec. 27-Jan. 2.

Third National Knitwear Industrial Exposition, Grand Central Palace, N. Y. City, A. B. Coffman, Manager, Feb. 11, '35.

American Ceramic Society, Hotel Statler, Buffalo, Feb. 17-22, '35.

Federated Textile Industries, Inc., annual dinner, Waldorf, Feb. 28, '35.

A. C. S., 89th meeting, N. Y. City, Apr. 22-27, '35.

Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 2-7, '35.

LOCAL TO NEW YORK *

Nov. 23, Societe de Chimie Industrielle in charge of joint meeting 4 technical societies.

Dec. 7, American Chemical Society.

OTHER LOCALITIES

Pittsburgh A. C. S. Section, Nov. 21.

Secretaries of Chemical Associations and Groups allied to chemistry (also the process industries) are urged to make use of this column.

* Chemist Club unless otherwise stated.

powder, potassium chloride, soda ash, and nitrates were largely responsible for China's reduced imports.

China with its large textile interests is an important market for dyes and takes more American dyes than any other foreign country. Exports of chemicals and allied products from China are limited, largest item being tung oil. Exports during the first half of the year declined 6% in value to $6,600,000 compared with the corresponding period last year. U. S. is China's largest export market for this product.

N. Z. Chemical Requirements

Pointing out that devaluation of the dollar appreciably improved position of American exporters in New Zealand, C. C. Concannon, Chief of the Commerce Department's Chemical Division, declares that this favorable development was apparent in the case of chemicals and allied products.

Although New Zealand is primarily an agricultural country, producing most of its fertilizer requirements as by-products of meat packing, country's imports of chemicals and allied products, exclusive of sulfur, were valued at approximately $900,000 in the first half of '34. Of the '34 imports, 13% was received directly from the U. S. as compared with 8% for '22, Mr. Concannon states.

While the U. S. still remains chief source of New Zealand's sulfur requirements, Japanese competition has resulted in markedly curtailing imports of the American product since the beginning of the year. During the first half of '34, American sulfur imported into New Zealand was valued at $150,000, which was approximately 60% of total sulfur imports, while during '33 American sulfur represented about 90% of total imports.

Besides sulfur, Concannon points out, New Zealand purchases substantial quantities of turpentine, paints, insecticides, and other industrial chemicals from the U. S.

Construction

Du Pont is to erect a medical research laboratory to cost $100,000. Its purpose is to study the possible effect of the company's new chemical products upon the health of employees during steps of manufacture and to study all possible effects of the new products on public health before the products are marketed.

Frozen Carbonic, Neville Island, Pittsburgh, will erect a dry ice plant.

Edwin M. Knowles China Clay Co., Newell, W. Va., will construct a plant addition.

Du Pont is erecting a $10,000 building in Wilmington for emergency offices.

U.S.I. is erecting a $15,000 addition to its boiler house at Curtis Bay plant.

Champion Co., Springfield, Ohio, manufacturer of chemical specialties, is to erect a new plant unit to cost $50,000.

Trinity College alumni are organizing to raise $700,000 for a new chemistry laboratory. College is located at Hartford, Conn.

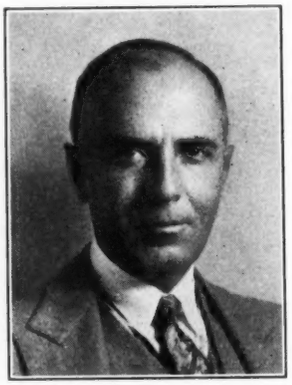
Sowega Fertilizer Association, Valdosta, Ga., will construct a fertilizer plant.

Eastman Kodak will enlarge its gelatin plant at Rochester.

Personal

¶ Derby Responds To Call To Head Drive for Funds—Morrison Pleads for Chemical Unemployed

H. L. Derby, president, American Cyanamid and Chemical, accepts chairmanship of the chemical and paints division of the Commerce and Industry Committee of the Citizens Family Welfare Committee (N. Y. Citl).



Harry L. Derby

Outstanding success last year brought urgent request from Myron C. Taylor that he again serve

"I am glad to cooperate in this worthy appeal again this year for the necessity of rehabilitating our less fortunate neighbor so he may become self-sustaining is as great this year as in former years," Mr. Derby said in accepting. "I am sure the chemical and paints division will give as good account of itself in this city-wide appeal for $2,000,000 as it did in the campaign last year when the division contributed approximately $65,000 of the total of $4,500,000 raised.

"In asking me to accept the chairmanship of this division Myron C. Taylor, general chairman, impressed upon me that in this year's campaign, business is on trial and business just must forge ahead now. I am certain it will if we refresh our faith by good works. If business fails to make this campaign the success it should be, its injurious effect will be felt not only in similar campaigns throughout the country, but will likewise have a disheartening effect on the community and the government as well.

"J. L. Schroeder, vice-president, A. Klipstein and Co., has assured me that he will again serve as vice-chairman of the division. Among the other members of last year's committee who I am sure will aid in putting over the objective of the Chemical and Paints division are George A. Anderson, Charles Pfizer Co.; Horace Bowker, Chairman, American Agricultural Chemical; Charles L. Gabriel, Commercial Solvents; R. C. Gaugler, of American Cyanamid and Chemical; William S. Gray, William S. Gray and Co.; E. K. Halbach, president, General Dyestuff Corp.; Herman Johns, Grasselli Chemical.

"Also L. S. Kohnstamm, H. Kohnstamm; A. Lichenstein, Ciba; A. L. Loenberg, vice-president, Barrett; Eugene L. Norton, president, Freeport Texas; Sidney V. Smith, Binney and Smith; Fred L. Somers Jr., Lavanburg Co.; and Holland R. Wemple, Texas Gulf Sulphur.

"The further need of a campaign of this sort is fully appreciated when it is shown that bare necessities of life furnished by public welfare agencies fail to adequately rehabilitate depression stricken families. These unfortunate neighbors of ours need a helping hand now, if ever, in their battle for self-independence."

Not To Forget Our Own

Committee on Unemployment and Relief for Chemists and Chemical Engineers, Frank G. Breyer, executive chairman, is again appealing for funds to carry on the very splendid work it is and has been doing in aiding those of the industry who are unemployed and in need of help. Not only is its record of obtaining positions for unemployed an enviable one, but it has helped those financially who were in dire need. A. Cressy Morrison, Union Carbide, is chairman of the finance committee, and has sent out letters to those who have contributed in the past, to companies and corporations in the industry and to individuals who are employed and are financially able to contribute. Committee headquar-

ADVERTISING PAGES REMOVED

ters are located at 300 Madison ave., N. Y. City.

Personal—Briefly Told

William H. Cameron, managing director of the National Safety Council, was entertained in Wilmington last month at a luncheon at which Harold L. Miner, du Pont director of safety, spoke.

The Misses Helen and Barbara Hooker, daughters of E. H. Hooker, were among those attending reception given in honor of Lady Benn and her daughter upon their arrival here. Lady Benn is the wife of the publisher of several important trade papers in England, including *The Chemical Age*.

Lord Melchett heads the British Institute of the Plastics Industry for '34-'35.

Irenee du Pont tells Philadelphia Manufacturers and Bankers Club members, "I am a little disappointed in the showing," referring to number joining American Liberty League.

Lammot du Pont, Jr., is chairman of the Delaware Roll Call Committee of the Red Cross.

D. Meredith Reese, son of Dr. and Mrs. Charles L. Reese, weds Miss Ann Louise Corbit Oct. 20, ceremony being performed by Bishop Frederick F. Reese, brother of Dr. Reese.

H. Maston Nixon of Corpus Christi, special Texas representative of Southern Alkali, is a guest at a luncheon meeting of the Southern States Industrial Council at the Rice Hotel in Houston on Oct. 19.

Dr. Irving Langmuir is in Japan and lecturing at the University of Japan.

Henry B. du Pont, director and connected with the du Pont Experimental Station, aviation enthusiast and creator of du Pont Airport, is elected chairman of the board of TWA, Inc., transcontinental airline.

James T. Skelly, Jr., son of the vice-president of Hercules Powder, is about to make his first solo flight.

John Hay Whitney, well-known sportsman and chairman of the board of Freeport Sulphur, is slightly injured in an airplane crackup when landing on his Llangollen estate near Upperville, Va., returning from N. Y. City for the Piedmont foxhound meet.

"Cy" Galliher, Columbia Alkali, is seriously injured in an automobile accident at Elmira, N. Y., on Oct. 23.

S. A. Pellerano, formerly chief chemist, Garfield Mfg. Co., Garfield, N. J. and A. J. Rissetto, formerly with Zonite Products, have entered in business as consulting chemists and chemical engineers, under the firm name of Associated Industrial Chemists, at 1918 71st st., Brooklyn, N. Y., specializing in pharmaceuticals, synthetic resins and plastic compositions.

Gustavo Bernal is opening chemical consultant offices at Monterey, Mexico.

Married

Joseph W. Ayers, director of research, C. K. Williams & Co., Easton, Pa., on Oct. 6 to Miss Caroline B. Stone of Lexington, Mass.

E. Hearn Simpson, du Pont's Chicago office, to Miss Margaret Lester McCracken, du Pont Wilmington legal & patent dept., on Oct. 6.

Overheard in the Plants

Cyanamid's general superintendent at Niagara Falls, A. O. Williams, describes European trip to Kiwanians.

Charles Boll, youthful Carbide & Carbon cost engineer, Charleston, W. Va., is stabbed by an unidentified negro; is in serious condition.

C. H. Daugherty of du Pont's Belle, West Virginia plant, is placed on a safety advisory board by Labor Commissioner Clarence L. Jarrett to work with state officials in coordinating safety practices.

American Cyanamid Cricket Club members (Niagara Falls plant) are guests of Mr. and Mrs. Frank Worrall. Card parties will be held throughout the winter season.

"On the Gangplank"

Victor Blagden, well-known London chemical and dye merchant, arrived on the *Berengaria* Oct. 23 and is at the St. Regis in N. Y. City.

Chester F. Hockley, a Davison Chemical receiver, returns from a European trip, voicing the opinion that world recovery is quite rapid.

Dr. Hugo Eckener, commander of the Graf Zeppelin, arrives in this country to arrange for regular service to the U. S. in the near future and, if possible, to obtain modification of the present regulations on exports of helium.

Dr. Owen Thompson, Dayton Rubber research chemist, is in Paris cooperating with the Citroen Motor Car Co.

Personnel

H. Bennett is no longer actively connected with Glyco Products, but will continue to act in an advisory and consulting capacity. He is now director of Chemical Publishing Co. of N. Y., at 175 5th ave., N. Y. City, publishers of "The Chemical Formulary," Volume I, and "Practical Everyday Chemistry."

Cliff Van Buskirk, who is completing 28 years of service with Corn Products Refining, is now manager, Metropolitan bulk sales division.

Equipment Co. Notes

V. G. Vaughan, creator of the miraculous "House of Tomorrow" at Mansfield, Ohio, is now with Spencer Thermostat, Attleboro, Mass., working on automatic temperature and humidity control.

Paul Blackburn, former Ferro Enamel Corp. sales manager, organizes Blackburn Chemical to manufacture chemical control apparatus. David Cable, previously assistant to Mr. Blackburn, is now Ferro Enamel sales manager.

D. M. Wilhelm, Patterson Foundry & Machine sales manager, is now secretary, and E. M. Underwood steps up to the sales managership.

Customs and Tariffs

¶ Treasury Dept. Finds No Dumping of Barium Hydrate or Stearic Acid

Imports of barium hydrate from Germany are not in violation of the anti-dumping law, Treasury Dept. decides after an investigation made following a notice of suspecting dumping issued by the appraising officer at Philadelphia, June 21 '34.

The Department, following a study of stearic acid imports from Belgium and England, fails to find grounds for issuing an "anti-dumping" order.

Companies

¶ DuPont Owns Less Than 1½% of Bakelite—New CO_2 Source for New England

CHEMICAL INDUSTRIES in its account of the recent munitions investigation (Oct., p. 357) reported that testimony presented at the hearing showed that the du Pont Company held an interest of $200,000 or more in the Bakelite Corp. CHEMICAL INDUSTRIES is authoritatively informed that the du Pont holdings of Bakelite stock amount to less than 1½% of the total amount of the stock outstanding and total is considerably less than $200,000.

N. E. Alcohol Makes CO_2

New England Alcohol, Everett, Mass., a Monsanto subsidiary, signs contract with York Ice Machinery for complete solid and liquid carbon dioxide plant using Reich-York process. Initial ca-

pacity is 10 tons daily with provision for doubling tonnage. Operation is expected within a few months.

Co. News Summarized

Pure Carbonic and Dry Ice Buffalo warehouses are now combined at 386 Elm st. Pure Carbonic is now operating own Tulsa warehouse at 215 N. Detroit st. Products of both companies are handled.

Chemical Syndicate, 6 E. 45 st., N. Y. City, establishes department for supplying chemicals for analytical and research work. Stocks are carried.

Carus Chemical, LaSalle, Ill., is making a very high grade hydroquinone.

Laboratory Glassware Corp., 482 N. 5th st., Philadelphia, adopts a special sample box to advertise the "Delta" filter paper line. Generous samples of the various types of paper best suited for each particular filtering problem is enclosed. Every practicing, research, analytical chemist and plant superintendent should obtain a sample box by simply dropping a post card to the company.

Emery Industries, Inc., Cincinnati, is developing a new softener for rubber, which is expected to be ready for the market shortly.

Apex Chemical Co. of Ohio acquires property at Nitro, W. Va., formerly occupied by Kavalco Products. Herbert S. Kreighbaum heads the new company. A number of new plasticizers are being produced, according to the announcement.

R. T. Vanderbilt, N. Y. City, is introducing butyl zimate—a new latex accelerator.

Godfrey L. Cabot, Inc., is selling 110 wells and 100 miles of pipe in West Virginia to the Hope Natural Gas Co., Clarksburg.

Carbondale Machine and Worthington Pump & Machinery are consolidating interests in the general refrigeration field, operating in the future as Carbondale Machine Corp., with offices at Harrison, N. J.

In the Manufacturing Centers

Mathieson, R. & H. division of du Pont, Carbide, and Isco Chemical are among Niagara Falls plants in an industrial bowling league.

Among those plants in the same section enrolled in 10th annual State-wide Accident Prevention Campaign of Associated Industries of N. Y. State are: Carbide, Oldbury Electrochemical, Niacet Chemicals, National Carbon and Mathieson.

Hooker Electrochemical's Niagara Fall's plant was partly shut down for a few hours Oct. 19 when a stoneware gas line broke. Superintendent Klaussen reports damage in electrolytic department small.

American Cyanamid's supervisors at Warners are holding luncheon meetings on alternate Tuesdays. A series of lectures on equipment and other company matters have been arranged with speakers drawn from a number of the equipment companies and from Cyanamid personnel. Harold Oswald, Oliver United Filters, spoke on filters Oct. 11; "Larry" Swenson, formerly of the sales but now of Cyanamid's production dept., spoke Oct. 25 on "Sale of Our Products —How the Production Departments Can Cooperate," and W. H. Withington, Ruggles Coles Engineering, on dryers on Nov. 8. Guy Pinner, Cyanamid's chief engineer speaks Nov. 22 on "Steam, Water, Air—Our Plant Layout." Major Hulings, assistant superintendent at Warners, is chairman of the group.

Dow's first aid department is now housed in a new building and all equipment is new.

Dow Chemical's plant was visited by members of the Michigan State Grange Convention held at Midland late last month.

Electro-Metallurgical's new construction at Gauley Bridge, W. Va., was the scene of a disaster Nov. 1 when 5 men were killed.

Plant Deaths

George E. Horning, former Carbide & Carbon employee at Niagara Falls, on Oct. 10.

Washington

¶ Additional Labeling Agreements Reached—NRA Code Authority Appointments—Code Notes

Manufacturing Chemists' Association is responsible for a 2nd labeling agreement, this time on carbon bisulfide. A similar agreement between manufacturers of chlorinated liquid hydrocarbons and the Public Health Service officials was negotiated a few weeks ago.

All shipments of bisulfide will bear a red warning label reading "Highly Volatile. Inflammable—Poison. Avoid Prolonged Breathing of Vapor."

M.C.A. is also responsible for labeling agreement between manufacturers of aniline oil and the Public Health Service, signed Oct. 17.

NRA

NRA recognizes the following as members of the code authority for the industrial alcohol industry:—M. F. Chase, C. Esteva, R. H. Grimm, A. K. Hamilton, and Glen Haskell, all of New York; J. J. Smith, Philadelphia; and L. S. Bacharach, New York, non-member, Industrial Alcohol Institute.

NRA also recognizes following memberships for the code authority for the sulphonated oil manufacturing industry: C. P. Gulick, National Oil Products, Harrison, N. J.; H. B. Hooper, Providence Dry-salters Co., Providence, R. I.; V. H. Berman, Onyx Oil & Chemical, Jersey City; John C. Wolke, of L. Sonneborn Sons, Inc., N. Y. City; F. C. Scholler, of Scholler Brothers, Inc., Philadelphia.

Approved

NRA approves trade practice plans and procedure for the shoe and leather finish, polish, and cement industry.

Automotive specialty manufacturers are now operating under a code which became effective Oct. 7.

Cobalt In '29

World production of cobalt in '29, according to *Die Chemische Industrie,* was between 1100 tons and 1200 tons, most of this coming from the Belgian Congo, Canada, and Burma. In '33 production fell to 550—600 tons, of which 122 came from Northern Rhodesia. Production from this new source has developed very rapidly during the current year, and it is estimated that by the end of 1934 as much as 1000 tons of Rhodesian cobalt may have been put on the market. This has already resulted in a big drop in the price of cobalt, and there is some prospect that its uses will be extended. Hitherto it has been employed very largely in the manufacture of special steels.

Corn Grind

The domestic grind of 4,830,714 bu. of corn in September is reported through the Corn Industries Research Foundation by the 11 refiners of starches, dextrines, syrups, sugars and other corn derivatives. This represents a decline of 26% as compared with the revised figure of 6,539,273 bu. for August '34, but is slightly above the level of activity of September '33. Total grind for 9 months is 48,176, 741 bu., approximately 9% below total for corresponding 9 months of '33.

Rehabilitation

Anderson-Beals Valuation is formed by Harold S. Robins, brother of George S. Robins, well-known St. Louis chemical distributer, and 2 others, to assist rehabilitation of firms in the chemical or others lines through RFC or other financial channels. Offices are located at 100 William st., N. Y. City.

Soviet chemical imports for first 6 months of '34 total 8,140 tons against 3,401 in the same period of '33.

Heavy Chemicals

¶ Southern Alkali's Corpus Christi Plant Officially Opened—Tonnages Gain in October—Mathieson's New Plant To Operate in December

A 2 day program, beginning Oct. 26, officially commemorated opening of the plant of Southern Alkali at Corpus Christi, thereby placing in operation one of the major industrial developments of the Southwest and one of the largest industrial undertakings projected in the U. S. within the last 4 years. Program was arranged by local committees headed by the Chamber of Commerce of Corpus Christi.

Included among the officials of Cyanamid and Pittsburgh Plate Glass, joint owners of Southern Alkali, attending the opening were—H. A. Galt, president, Southern Alkali and vice-president of Pittsburgh Plate Glass, C. M. Brown, vice-president of Southern Alkali and chairman of the board of Pittsburgh Plate Glass, Harry L. Derby, vice-president, Southern Alkali and vice-president of American Cyanamid, K. F. Cooper, vice-president, Southern Alkali and vice-president, American Cyanamid, Dr. W. S. Landis, vice-president, Southern Alkali and vice-president, American Cyanamid, Raymond Pitcairn, director, Southern Alkali and of the Pittsburgh Plate Glass, H. S. Wherrett, president of Pittsburgh Plate Glass, Dr. M. C. Whitaker, vice-president, **American Cyanamid, Eli Winkler, K. C. Frazier,** southwestern sales manager, Southern Alkali, T. E. Jackson, southwestern representative, Pittsburgh Plate Glass.

Notables Present

Among the visitors who were guests of the local host committees were many men prominent in the public and business life of Texas and the Southwest, including representatives of the State, the newspapers and the transportation systems. Included among the official representatives of the State of Texas were U. S. Senator, Tom Connally; governor-elect, James V. Allred; lieutenant governor-elect, Walter Woodull.

Well over 400 guests gathered in Corpus Christi for the occasion. On Oct. 26 an official party of approximately 100 visited and inspected the newly opened plant, proceeding from there to board the Coast Guard cutter *U.S.S. Saranac* at Southern Alkali's docks for a trip through the Corpus Christi ship channel to the jetties at Aransas Pass. In the evening an industrial banquet was held at the Plaza Hotel, attended by approximately 400. Speakers were: Speaking for the Nation—Hon. Tom Connally, U. S. Senator; Speaking for the State—Hon. James V. Allred, governor-elect of Texas; Speaking for Industry—Harry L. Derby, vice-president, Southern Alkali and vice-president of American Cyanamid.

On Oct. 27 the program included a visit to the world famous Santa Gertrudis Ranch near Kingsville, where an old fashioned barbecue was held. Hosts at the barbecue were Robert Kleberg, Congressman Richard M. Kleberg, Caesar Kleberg, and Richard King, Program of entertainment was concluded later by a dinner to H. A. Galt, president, Southern Alkali Corp.

Important Price Changes

ADVANCED

	Oct. 31	Sept. 30
Arsenic, red	$0.15¾	$0.15
Barium chlorate	.14½	.14
Bleaching powder, l.c.l.	2.15	2.05
Chlorine, tanks	2.00	1.85
Glycerine, dynamite	.13¾	.13
saponification	.10½	.09¾
soap lye	.09	.08¾

DECLINED

Acid, acetic 28%	$2.40	$2.53
glacial	8.25	8.60
Calcium acetate	2.00	2.25

INDUSTRIAL CHEMICALS

	Sept.	Aug.
Exports	$1,782*	$1,795*
Imports	1,058*	1,193*

* 000 omitted.

DEPT. OF LABOR INDICES

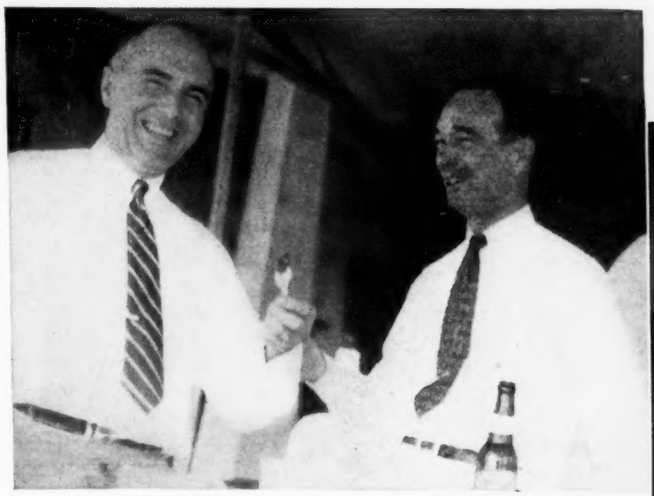
	Sept. '34	Sept. '33
Chemicals, price	80.3	78.8

Busy Signing for '35

Industrial chemical shipments to consuming channels were in greater volume in October than in September, but were decidedly not up to expectations. The seasonal advance did not reach the totals of the corresponding period in '33, but were considerably ahead of October '32 totals. Threat of a strike in the Paterson and Passaic textile dyeing centers caused much uncertainty and consequently an appreciable curtailment of operating schedules. Cotton centers, on the other hand, reported a quick revival following the ending of the nation-wide textile strike. Operating schedules in rayon centers are fairly heavy.

Interest centers largely in the matter of '35 contracts. Alkali consumers, after a period of hesitancy, are reported signing "the dotted line" in greater numbers at the '34 prices. Chlorine producers are experiencing very little trouble in signing buyers at the $2.00 level, an advance of 15c over this year's contract price.

Weakness persists in acetate of lime and another 25c reduction on Nov. 1 brings the price down to $2.00. Stocks



Photographs by McGregor

Above, H. L. Derby (Cyanamid) and Clarence M. Brown, (Pittsburgh Plate Glass chairman) discuss merits of cowboy stew and barbecue; right, chemicals, plate glass and business cares are forgotten for the moment by Dr. Walter S. Landis (left) and Hugh A. Galt (Southern Alkali president) as the two enjoy barbecue on the famous King Ranch near Corpus Christi. Official opening of Southern Alkali's plant was attended by 400 guests

are heavy and curtailment in textiles has brought about accumulations of acetic. A price revision in the acid was made immediately following the drop in lime. The schedule is now being quoted as follows:

Grades	C/L Barrels Per 100 lbs.	L/C/L Barrels Per 100 lbs.	C/L Carboys Per 100 lbs.	L/C/L Carboys Per 100 lbs.
Commercial and/or Redistilled				
28%	$2.40	$2.65	$2.90	$3.15
56%	4.50	4.75	5.00	5.25
70%	5.60	5.85	6.10	6.35
80%	6.39	6.64	6.89	7.14
Pure				
30%	3.47	3.72	3.97	4.22
36%	3.89	4.14	4.39	4.64
60%	6.52	6.77	7.02	7.27
80%	8.18	8.43	8.68	8.93
Glacial				
99½%	8.25	8.50	8.75	9.00

Above prices apply delivered destination in the following States only, with empty containers returnable at seller's expense of freight: Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina.

Mathieson's New Offices

Mathieson Alkali, in an expansion of its New York offices, will move executive offices to the Lincoln Bldg. on E. 42 st. Dec. 15. Leasing for a long term of the 46th and 47th floors and the major part of the 48th floor in the midtown skyscraper to Mathieson was announced by J. G. Morgan, manager for the Lincoln Bldg. Corp. Space involved amounts to about 22,000 sq. feet, and change will bring to New York the vice-president and director of operations and his staff, now at Saltville, Va., where one of the company's plants is located.

This will be the 6th firm in the chemical business to have large space in the Lincoln Bldg. Others are Air Reduction, U. S. Industrial Alcohol, Hooker Electro-chemical, Michigan Alkali and Atlas Powder.

Isco Carbonate

Innis, Speiden is now offering liquid carbonate of potash. High quality is said to be particularly interesting in the textile trade.

Solvay in Houston

Solvay Sales, distributors of alkalies and chemical products manufactured by Solvay Process, opens an office in Houston. New office is located in the Petroleum Bldg., Texas ave. and Austin st.

This expansion of sales and service facilities will enable Solvay to better serve its customers throughout the Southwest. It is a development in keeping with the steady progress made by the alkali-consuming industries of this section.

Construction is now well under way on the new Solvay plant located at Baton Rouge. It is expected that it will be in operation early in '35.

Ready at Lake Charles

Mathieson Alkali's $7,000,000 plant at Lake Charles, La., will begin operations early in December. According to officials of The Mathieson Alkali Works, construction work at the new plant is being maintained considerably ahead of schedule, despite the fact that it involves a number of engineering developments embodied in such a plant for the first time.

The Lake Charles plant, it was pointed out, will provide a new source of supply for soda ash, caustic soda and related heavy chemical products over a wide area in the South and Southwest. It will also permit ecnomical shipment of alkali by water to points on the Atlantic and Pacific seaboards, along the Gulf Coast, and on inland waterways including the Mississippi River and its tributaries.

In addition to rail service via the Southern Pacific, Kansas City Southern or Missouri Pacific and their connections, plant includes a dock system for loading both barges and ocean-going steamers. These facilities will play an important part in bringing consumer of alkali and his source of supply closer together from the standpoint of transportation costs.

Since its incorporation in Virginia in '92, there has been a close relation between Mathieson and industrial development in the South. For nearly 40 years, the Mathieson plant at Saltville, being the only source of alkali in the South, has saved Southern consumers many thousands of dollars in transportation costs each year. Company also operates a 3rd plant at Niagara Falls, N. Y., where caustic, anhydrous ammonia, liquid chlorine and chlorine products are produced.

Fine Chemicals

¶ Bismuth Salts and Mercurials Decline—Merck Fellowships—Status of Glycerine

Declines in bismuth salts and mercurials were outstanding price reductions in October. In both instances weakness in the corresponding metals was primarily responsible for the losses. Silver nitrate, on the other hand, is up 2c in the past 30 day period as a result of higher silver prices (silver registered a 5-year high in October). A competitive situation is blamed for weakness in iron and ammonium and iron and sodium oxalates. At the moment, tartaric and the tartrates are quiet. A similar situation prevails in citric.

Volume is said to be satisfactory and ahead of the totals for the corresponding month last year. Seasonal items are moving out in larger quantities. A very tight situation is developing in c.p. glycerine, with producers' stocks none too large.

Recent Italian decree on mercury exports is not expected to have much influence on the domestic market here. It is said that Italian mercury producers will be permitted to export up to the limits of the cartel arrangement, and, in addition, the larger part of the U. S. imports are said to be of Spanish origin. U. S. producers' plight remains. According to those who are certainly in a position to know, present price is below production costs in this country. Further appeal to Governmental agencies for relief of one sort or another is quite likely in the near future.

Important Price Changes

ADVANCED

	Oct. 31	Sept. 30
Corn syrup, 42°	$3.49	$3.59
43°	3.54	3.64
Silver nitrate	.37⅜	.35⅜

DECLINED

Bismuth, metal	$1.10	$1.20
hydroxide	3.15	3.25
subcarbonate	1.65	1.80
subgallate	1.65	1.75
subsallicylate	2.45	2.55
subnitrate	1.40	1.50
trioxide	3.45	3.55
Iron & ammonium oxalate	.26½	.27½
Iron & sodium oxalate	.26½	.27½
Mercury, metal	73.50	74.00
Mercurials, calomel	1.16	1.31
corrosive sublimate	.78	.88
red precipitate	1.34	1.44
white precipitate	1.36	1.51

In the Aid of Mankind

George W. Merck, President of Merck & Co., announces that the following list of research fellowships has been established in colleges and universities by Merck & Co., Inc.: University of California, for the study of Pharmacology; University of Pennsylvania, for the study of Physiology; University of Pennsylvania, for the study of sedative drugs on the horse and ox; University of Virginia, through the National Research Council, for the study of alkaloids; University of Pennsylvania, for the study of Bacteriology.

Glycerine Surveyed

The '34 glycerine market is featured by larger domestic production (nearly 50% increase, to 143,000,000 lbs.) and heavier imports (an increase of 133%

of crude to 11,000,000 lbs.). Production trend has been down for several years. Glycerine of 80% basis, ranked first in production and increased 55% to 79,000,000 lbs., and was followed by C.P. which increased 77% to 41,000,000 lbs., and grades used chiefly in the manufacture of industrial and other explosives which increased 32% to 23,000,000 lbs., compared with corresponding 6-months' period of '33.

Notwithstanding this large production gain, U. S. imports of crude during first 8 months of '34 increased 133%. Imports of refined declined 40% in quantity to 1,409,500 lbs., but value advanced slightly to $132,750.

Glycerine, by-product of soap manufacturing, has wide industrial uses, particularly in explosives, medicines, and cosmetics. Large quantities are used in anti-freeze solutions, inks, liquid soaps, and the manufacture of plastics, tobacco, and a score of other products. Last census of manufactures shows a total of 48 plants, 38 of which are east of the Mississippi. Ohio leads with 9 followed by New Jersey and New York with 6 each, California and Massachusetts with 5 each, and Illinois and Pennsylvania with 3 each.

Prices have been advancing sharply. Depression lows were registered in '32, in the face of large accumulations. Following comparison indicates wide price recovery since then:

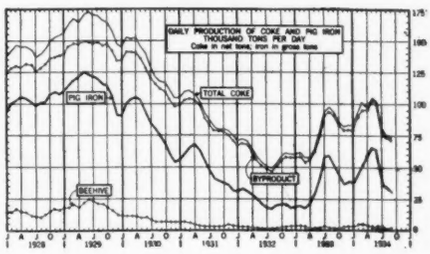
	Present Market	Market Jan. 1, '34	Market Oct., '33	Lowest '32
C. P., drums	$0.14	$0.11	$0.10¼	$0.09¾
Dynamite	.13¾	.10¼	.09½	.07¼
Saponification	.09⅝	.07	.08	.04¾
Soaplye	.08¾	.06½	.06	.04

What quantities are going into explosives are not, of course, known, but the explanation that large quantities are being taken out of the market seems logical.

Coal Tar Chemicals

¶ Coking Operations Again Decline—Benzol Firmer—Napthalene '35 Prices Lower — Dye Imports Show Little Change

A further decline marked the production of coke in September. Output of both beehive and byproduct coke amounted to 2,229,571 tons, or 74,644 tons per working day. This represents



Bureau of Census

a decrease of 0.7% in comparison with the daily rate of 75,157 tons prevailing in August. Despite a 3-month recession, however, accumulated coke tonnage for the 1st 9 months of '34 shows an increase of 23.2% over the corresponding period of '33.

Production of byproduct coke for the 30 days of September totaled 2,174,771 tons, a daily average of 72,492 tons. Compared with August, September rate declined 1.4%. Daily average of pig iron production decreased 12.0%; following this trend, though to a lesser degree, coke production at furnace plants decreased 4.4%, while that at merchant plants increased 2.9%.

Beehive coke production increased substantially during the month, daily average of 2,192 tons being 35.4% higher than that of August.

Stocks at byproduct plants rose from 2,648,085 tons to 2,845,917 tons, or 7.5%, increase being shared almost equally by furnace and merchant plants. Although stocks have risen steadily for 4 months, average to date is 7.6% below same period of '33.

Important Price Changes

ADVANCED

	Oct. 31	Sept. 30
Acid maleic, powdered	$0.29	$0.25
Maleic anhydride	.32	.28

DECLINED

None

Maleic Higher

Higher production costs are held responsible for an upward revision in maleic acid quotations. Prices, generally, are firm. This is particularly true of benzol, shipments in the last 3 weeks of the month being much larger than for a long period. Seasonal let-down is reported in toluol demand but the continued low rate of activity in the steel industry, holding coking operations down to a minimum, prevents any accumulation of stocks. Better demand is reported for cresylic with corresponding improvement in the price structure, although no changes have been made in published quotations. As the month closed, contract prices for naphthalene for '35 remain unknown. In many quarters belief is expressed that if any change is made, that it will be on the downward side.* Intermediates moved out in satisfactory volume, and sales of dyestuffs were greatly improved over the September figures. What the effect of the walk-out by the Paterson and Passaic dyers will be, is difficult at the moment to speculate on. It was hoped right up to the last minute that mediation would prove successful. A long period of inactivity in those centers and others at this time would prove disasterous. As the month closed, operators have been out a week and are threatening to carry out workers in other sections of the country.

Sept. Dye Imports

U. S. September imports of coal tar dyes show little change from preceding month or from September last year, though the tendency for Switzerland to supply a greater share of the American import demand continues.

Value of such imports in September totalled $430,430 compared with $489,000 for the preceding month and the quantity declined slightly from 301,200 to 282,500 lbs. Since the beginning of '34 imports have remained approximately the same in value as for the first 9 months of '33—$3,551,000, a decline of only $10,000—but quantity has decreased from 3,350,000 to the 2,407,000 lbs. Browns were prominent among September imports.

Imports of aromatic chemicals in September amounted to 3,300 lbs., valued at $6,800, a considerable increase

* '35 naphthalene prices as finally announced represent a ½c reduction on ball and flake material, and a ¼c reduction on dyestuffs grade.

Coal Tar Statistics

	Sept. 1934	Aug. 1934	Sept. 1933	Calendar yr. to date 1934	Calendar yr. to date 1933
Coking coal—by-prod. ovens, tons	3,145,418	3,305,524	3,926,577	34,779,288	28,003,685
Stocks of coke, by-prod. ovens, tons	2,845,917	2,648,085	3,079,623	.....	.....
Coke production, by-prod.	2,174,771	2,279,672	2,712,050	23,830,949	19,341,035
Benzol production, gals.	4,560,000	4,844,000	6,501,000	32,557,000	45,332,000
Light oil production, gals.	9,271,048	9,718,240	11,554,136	102,261,105	84,621,881
Tar output, gals.	31,029,633	32,526,356	38,637,517	342,228,192	252,856,331
Ammonium sulfate prod., tons	36,354	38,113	45,273	406,001	321,935
Coal tar exports, 000 omitted	$910	$868	.....	.....	.....
Coal tar imports, 000 omitted	$847	$1,034	.....	.....	.....

Imports	September, 1934 Volume	September, 1934 Value	August, 1934 Volume	August, 1934 Value	July, 1934 Volume	July, 1934 Value
Creosote oil, gal.	827,816	$77,049	2,416,595	$246,067	4,571,624	$419,605
Cresylic acid, gal.	85,122	29,404	61,380	21,567	72,646	23,229
Naphthalene, crude, lbs.	2,791,185	42,158	2,930,520	42,334	5,961,191	83,671
Crude coal tar (bbl.)	13,439	24,725	24,831	50,007	14,752	24,209
Coal tar pitch (bbl.)	.....	.....	50	329	45	324
Other distillates, n.s.p.f.	.....	.....	21,070	1,715	55,427	1,337
Anthracene, crude	.....	.....	.....	.....	.....	.....
Benzol, gal.	.....	.....	.....	.....	.....	.....
Pyridine, gal.	.....	.....	.....	.....	.....	.....
Synthetic dyes, lbs.	282,528	430,429	.....	.....	.....	.....

over the 2 preceding months. Imports since the beginning of the year have amounted to only 20,000 lbs. compared with 31,000 for the first three months of '33.

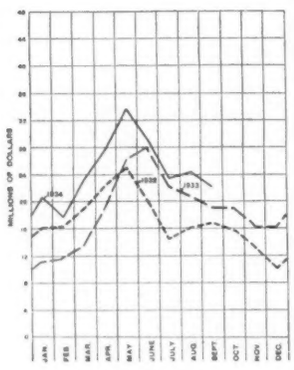
Receipts of medicinals, photographic developers, and other coal tar products declined in September and for the first 9 months of the year were valued at $1,345,000, at an average invoice price of $1.00 per lb., compared with 1,416,000 lbs., valued at $880,000, for the corresponding period of last year.

Exports of coal tar and its products during the first 8 months of '34 were valued at $9,155,000, an increase of 20% over the corresponding period of the preceding year. Of this total, colors, dyes, stains, and color lakes, of coal tar origin accounted for $3,948,000, representing a gain of more than 34% in value, and the quantity rose 11% to 13,715,000 lbs. China continues an outstanding market for American dyes.

Paints, Lacquers and Varnish

¶ Paint Sales Decline Seasonally—Raw Materials Demand Better—Patton, Pittsburgh Plate, Dead

Statistics on sales of paint, varnish, and lacquer products, based on data reported to the Bureau of the Census by 586 identical establishments show that September sales totalled $22,234,400, as compared with $24,350,726 in August, '34 and only $19,097,803 in September, '33 and $16,805,712 in the same month of '32. Industrial sales in September amounted to only $5,268,057, as compared with $6,578,872 in August and $5,544,686 in September of '33. Trade sales totalled $8,908,543 in September, compared with $9,502,007 in August and $7,462,113 in July. Trend in paint sales is seasonally down.



Sales Trend

Important Price Changes

ADVANCED

	Oct. 31	Sept. 30
China clay, bulk	$9.00	$8.00
bags	11.25	9.75

DECLINED

Casein, 20-30	$0.09½	$0.10¾
80-100	.10½	.11¼
Orange Mineral, Tours	.15¾	.16⅝
Vermillion, English	1.56	1.59

EXPORTS

	Sept. '34	Aug. '34
Pigments, paints, varnishes	$1,182*	$1,264*

* 000 omitted.

DEPT. OF LABOR STATISTICS

	Sept. '34	Sept. '33	Aug. '34
Employment	98.8b	94.1	99.1
Payroll	75.8b	60.7	77.9
Prices	79.5	77.3	79.9

b Preliminary.

HOLC Takes Hold

Paint making chemicals were in better demand in October. Further improvement is anticipated in November as the Government's modernization program develops. Paint manufacturers are more encouraged by the recent response to the HOLC plan reported from all sections of the country. At first, figures were a bit disappointing, but in the last 2 weeks of October number of applications recorded has increased at a satisfactory rate.

Interest centers largely in '35 contract prices, but producers of pigments and other paint materials are holding back in an effort to gain additional information as to possible '35 trends before announcing figures. It is thought that most of the '35 contract quotations will be released about Nov. 15. Because of the nominal state of prices at the moment, very few changes were reported last month. Weakness in casein persists; stocks are said to have accumulated. China clay quotations are $1 higher for bulk and $1.50 for material in paper bags. Lead pigments were adjusted at intervals in the past month, as the metal market fluctuated. Shellac is lower; English vermillion is off 3c to $1.56; a few of the varnish gums were reduced. The ½c rise in stearic acid in October did not result in any readjustment in stearates. Latter were increased 1c late in August and it is felt in most quarters that the present levels will be retained for the balance of the year, barring further stearic increases, of course.

Finished paint prices remain fairly steady. *Architectural Record's* index of wholesale price of paint materials is but slightly above the corresponding level of last year. Despite the bright outlook for the future construction statistics are still very disappointing. Volume of new construction started in 37 Eastern States during September reached a total of $110,219,200, according to the contract records of F. W. Dodge Corp. Total represents loss of more than 8% from August's $120,014,600 and approximately same percentage decline from September, '33, total of $120,134,400. Residential building contracts awarded totaled $17,871,600 compared with $18,641,000 for August, and $21,549,000 for September of last year. Non-residential building amounted to $42,359,300 as contrasted with $50,816,900 for the preceding month and $37,836,300 for the corresponding month of last year. Public works, with increased highway work, showed an actual increase over August, totals amounting $43,478,500 and $41,905,900, respectively. September total for heavy engineering projects was likewise disappointing.

Linseed Statistics

A decline of 28,374,854 lbs. in production of linseed oil during the 3rd quarter of the present year compared with that of last year is reported by the Bureau of Census.

Reports from 26 mills which crushed flaxseed during the quarter ending Sept. 30, showed a crush of 120,194 tons of flaxseed and a production of 85,037,681 lbs. of linseed oil. These figures compare with 170,064 tons of seed crushed and 113,412,535 lbs. of oil produced for the corresponding quarter of '33; 104,693 tons of seed and 68,502,774 lbs. of oil in '32; 213,083 tons of seed and 141,204,905 lbs. of oil in '31, and 164,834 tons of seed and 108,236,266 lbs. of oil in '30.

Stock of flaxseed at the mills on Sept. 30 amounted to 38,311 tons, compared with 80,332 tons for the same date in '33; with 74,576 tons in '32; with 118,760 tons in '31, and with 94,730 tons in '30.

Stocks of linseed oil reported by the crushers were 72,637,360 lbs. on Sept. 30, compared with 65,797,839 for the same date in '33; 65,863,475 in '32; 76,150,682 in '31, and 53,174,928 in '30.

Patton Dies

Ludington Patton, 63, vice-president and director of Pittsburgh Plate Glass and an outstanding executive in the paint industry for years, died Oct. 20 at his River Hills home in Wisconsin. He joined his father, James E. Patton, in the latter's paint concern early in life and subsequently served as vice-president and then president. When Patton Paint Co. became the Milwaukee branch of Pittsburgh Plate Glass in 1920, he became a director in the Glass Company. He was also chairman of the board of

Ditzler Color, Detroit, and president of the American Tung Oil Corp.

Oiticica Oil

Dr. Henry A. Gardner, director of the scientific section, National Paint, Varnish & Lacquer Association, Inc., who has recently returned from a trip to Brazil, issues notes on his Brazilian researches in connection with oiticica oil (pronounced oy-ti-seeka) which vividly illustrates practice of the scientific section in searching the world for new materials and new uses for materials in the paint, varnish and lacquer manufacturing industry.

Scientific section's publication is officially described as "Circular No. 470" and is illustrated with many interesting pictures brought from Brazil. Circular is bound to be of high interest to all members of the association engaged in the manufacture of products in which the use of oiticica oil may be feasible.

Glidden Acquires

Glidden acquires exclusive rights to German patents for manufacturing and refining lecithin, and American patents and business of American Lecithin Co. Lecithin is used in the confectionery and baking trades in connection with chocolate coatings, and also in the rubber and rayon industries in finishing processes. It was formerly a very expensive product and its only source was from the whites of eggs until German chemists developed the process of extracting it from soya bean oil.

Glidden's new plant for manufacture of titanium dioxide at Baltimore will begin operations Nov. 1. Plant will manufacture pure titanium oxide pigment under special patented processes.

Paint Companies

McNamara-Detroit Varnish Works, Detroit, is now the Detroit Varnish Works.

Schermerhorn Paint Products, Wyandotte, Mich., is formed by George F. Schermerhorn, well-known in midwest paint circles.

Thresher Varnish, Dayton, is celebrating its 75th anniversary.

Western Dry Color's vice-president, Frederick A. Beer, is rounding out 50 years of company service.

Yarnell Paint, Philadelphia, is starting an industrial division in charge of Charles A. Wilson.

General Plastics appoints C. L. Zimmerman, Cincinnati, and William B. Tabler, Louisville, distributers of Durez resins.

Pittsburgh Plate Glass places its paint advertising with N. W. Ayer & Son.

William P. Hamann joins Valentine & Co. to do special merchandising work.

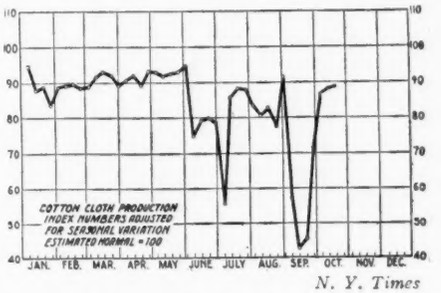
James B. Sipe & Co., Pittsburgh paint manufacturer, moves offices to plant.

Oscar Nelson, president of United Carbon, was host to over 300 guests at the company's plant at Charleston, W. Va., and later at his estate on the outskirts of the city.

Textile and Tanning Chemicals

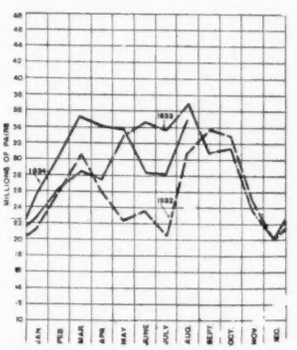
¶ Chemical Demand Spotty as Dyers Strike

Market for textile chemicals and dyes remains spotty, although October volume was decidedly better than September, when the textile strike was at its height. However, the situation in Paterson and Passaic dyeing centers


COTTON CLOTH PRODUCTION
INDEX NUMBERS ADJUSTED
FOR SEASONAL VARIATION
ESTIMATED NORMAL = 100
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.

N. Y. Times

reached a deadlock in the last week of October and 25,000 workers are reported out on strike with union threats "aired" that additional workers will be called out in Pennsylvania and New England. So, while the cotton industry is operating at about an 80% rate (highest since May), outlook in the textile field is very uncertain. Sales of chemicals are not in as large a volume as they might very readily be, except for the labor condition. Efforts to arbitrate the dyers' strike have not been successful, and the situation may get worse before getting better. Strikers are demanding a 30-hour week, a $1 an hour minimum wage and a closed shop. With retail trade good, stocks are said to be none too large. Should the unexpected happen and the Government mediator effect a settlement, it is quite likely that the dye plants will be run temporarily at capacity. But, in the meantime, dye plant executives cannot be blamed for hand-to-mouth purchasing.



Shoe production.

Tanning operations are but slightly better. Several of the tanning materials are sharply higher. Generally speaking, stocks locally are at a pretty low point. Trade is discussing the recently formed Argentine quebracho pool and its possibilities. Extract prices here are unchanged, however, to regular buyers. Bichromate prices are extremely late in appearing this year. Usually these are announced between the 1st and the 15th of October, but the month closes without any release of the '35 figures. Uncertainty over '35 chrome ore prices is advanced as one reason for the delay.

Important Price Changes

	Oct. 31	Sept. 30
ADVANCED		
Gambier, common	$0.06¼	$0.05¾
Singapore cubes	.07¼	.06
Myrobalans J2	16.50	16.00
Valonia beards, cups	28.50	25.50
DECLINED		
Albumin, egg	$0.85	$0.87
Dextrin, British gum	4.20	4.30
canary corn	3.95	4.05
white	3.90	4.00
Mangrove bark	29.00	32.00
Starch, powdered	3.36	3.56
Zinc dust	.0582½	.059

Starch and dextrin prices jumped about last month, but the final result was a net loss from the prices prevailing late in September. Dye prices are steady; no change is reported in sulfonated oil schedules.

Production of silk and acetate fabrics by stock-carrying mills for half-month ended Oct. 15 totaled 6,526,000 yards, an increase of 53.9% over last half of September. Output by commission mills totaled 3,472,000 yards, an increase of 101% over last half of September, when strike conditions were a factor. Sales by the stock mills were 2.5% under September figures but 15% ahead of the same period last year. Shipments by converters rose 98.5% over the last half of September. Unsold stocks on hand Oct. 15 were 57,525,000 yards, of which 26,210,000 were in the raw.

Company Items

Tannin Corp. is said to have accumulated a backlog of 70,000 tons of quebracho to offset possible adverse developments in the Argentine where threats are made of forming a "pool" and curtailing output to "boost" prices.

U. S. Testing is now in larger quarters at 1450 Broadway, N. Y. City. Dr. O. A. Hougan, well-known in research circles, now heads the miscellaneous testing dept.

Kenya Tanning Extract's new wattle factory is operating.

Chemical Specialties

¶ ***Packaging Exposition Goes to Chicago—N.A.I.D.M. Meets in N. Y.***

Fifth Packaging Exposition will be held at the Palmer House, Chicago, from Mar. 5 to 8, '35, inclusive, it is announced by Alvin E. Dodd, executive vice-president of American Management Association, sponsoring organization. Concurrent with the exposition there will be held the American Management Association's Consumer Marketing Conference, together with the Conferences and Clinics on Packaging, Packing and Shipping.

Fifth Packaging Exposition goes to Chicago for the first time in 3 years as the result of the preference for that city expressed by companies who have exhibited in the past 4 expositions. Questionnaire sent recently to exhibitors established clearly the attitude that holding the show in Chicago presented a desirable opportunity to exhibiting companies to strengthen and expand their contacts with the mid-West market.

Packaging Exposition will present equipment, machinery, materials, supplies and services involved in chief phases of packaging, packing and shipping. An attendance upwards of 7,500 package users, business executives, merchandising experts and production men is anticipated at the show, on the basis of attendance records at the past 4 expositions.

Fourth Irwin D. Wolf Award Competition will be held in conjunction with the exposition. In addition, American Management Association announces that plans now are in formulation for a series of new awards in packaging, packing and shipping. Announcement of complete details in connection with these awards will be made in the near future.

Management offices of the Fifth Packaging Exposition are at 232 Madison ave., N. Y. City. Roberts Everett Associates, Inc., will again manage the exposition for the American Management Association.

Noteworthy Program

National Association of Insecticide and Disinfectant Manufacturers' Committee in charge of the annual convention (Dec. 11-12) have been engaged in the preparation of the program and their first report indicates that arrangements are well under way to make it one of particular interest. Some of the subjects to be presented are: Compensation and Commissions paid Sanitary Supply Salesmen; What's Wrong with Household Insecticide Sales; Uses and Advantages of Rotenone Products; Testing of Household Insecticides. There will be a talk on the new Campbell Method, and a detailed report by the Insecticide Standardization Committee of the comparative value of all methods. The Code Authority will make its report and there will be a general discussion of Code matters. Another topic will be New and Proposed Federal and State Legislation affecting Insecticides, Disinfectants, etc.

Grant Dorland of the Entertainment Committee has promised "something different" in the way of entertainment He has planned for the Annual Dinner to be held on Tuesday evening, Dec. 12, at the Downtown Athletic Club, which is located at 18 West st., N. Y. City.

Specialty Codes

Objections and suggestions concerning a proposed amendment to the code of fair competition for the insecticide and disinfectant manufacturing industry providing for a code authority budget and basis of contribution must be submitted to Acting Deputy Administrator Ovid E. Roberts, Jr., Washington, D. C., before Nov. 15.

Lye

Code Authority for the lye industry submits application for termination of exemption conferred in paragraph III of Administrative Order No. X-36, dated May 26, 1934, whereby members of its industry whose principal line of business is embraced in a trade or industry subject to a code other than the code for the above industry were exempted from obligation to contribute to the expense of code administration for the above industry.

Companies

Sweeping Compound Manufacturers Co., N. Y. City, is incorporated by Martin Siegelbaum, 165 Broadway.

Drackett Chemical, Cincinnati, will introduce "Windex," a window cleaning compound through space in mid-west papers.

Langwell Chemical & Mfg., Milwaukee, plans line of liquid soaps and agricultural and household insecticides.

German Moth Preventives

A number of leading German chemical concerns are specializing in moth preventives and in recent months have been able to substantially increase shipments to foreign markets. Japan has become a leading market for these German products, due to policy of military authorities favoring greater use of moth preventives in military uniforms.

In Germany application of moth-proof preparations to woolen and fur manufactures is being urged as part of the active national campaign now being waged for preservation and economy in the use of these materials.

While a number of German manufacturers produce moth preventives, one leading firm has probably given more attention than any other to developing trade in this field and has been so successful that it has recently established a new division which handles this type of business separately from general insecticides. This firm claims its product has revolutionized the combating of moths by enabling materials to be made moth-proof at the time of manufacture, thus placing the burden of protection against moths upon the manufacturer rather than the consumer of the goods. New moth-proof division of this concern has now become self-supporting. Annual loss from moth destruction in the U. S. is estimated to be in the neighborhood of $100,000,000.

Containers

Wilson & Bennett Mfg. Co. with main offices and factory at 6532 South Menard ave., Chicago, announces completion of new eastern factory located at 353 Danforth ave., Jersey City. Complete modern equipment has been installed in the large 4-story factory building that it now occupies, and company is in production on line of steel barrels, drums, and pails.

Oils and Fats

¶ ***Cottonseed Features the Commodity Markets — Price Movement in Oils Mixed***

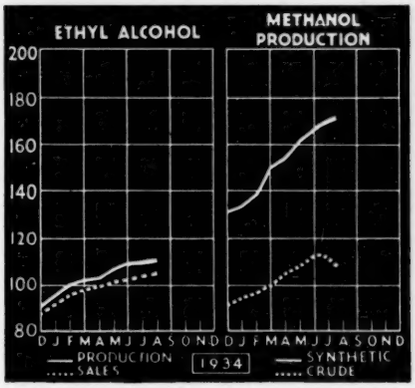
Making of new highs in cottonseed oil and lard commodity markets were almost daily occurrences in the past month. With monotonous regularity cottonseed oil futures quotations on the N. Y. Commodity Exchange indicated bullish sentiment, even when other commodity markets were experiencing reactions. At present prices cottonseed has a decided price edge over lard. Statistically the picture is most favorable. Some 9,000,000 bales of cotton will mean 2,025,000 barrels of oil; 9,500,000 bales will mean 2,137,500 barrels; 10,000,000 bales will mean 2,225,000 barrels. Ten-year average use of cottonseed oil is 3,300,000 barrels. Even in the worst year of the depression, '31-'32, consumption fell to only 2,912,279 barrels. The 1933-34 carryover of oil is 1,879,794 barrels

ADVERTISEMENT—*This entire page is a paid advertisement.*

SOLVENT NEWS

Reg. U. S. Pat. Off.

NOVEMBER ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1934



(moving twelve-month averages, 1931 = 100)

CURRENT PRODUCTION

		1934	1933
ETHYL ALCOHOL			
1000 proof gals.	Jan.-Aug.	106,611	86,341
	August	13,823	12,482
	July	13,702	11,684
Sales			
1000 proof gals.	Jan.-Aug.	92,126	67,186
	August	13,156	10,232
	July	12,693	9,345
METHANOL			
Crude 1000 gals.	Jan.-Aug.	2,539	1,849
	August	254	262
	July	256	211
Synthetic 1000 gals.	Jan.-Aug.	7,053	3,628
	August	952	860
	July	939	562

INDUSTRIAL ALCOHOL PRODUCTION AND SALES UP—METHANOL LAGS

August figures for production and sales of industrial ethyl alcohol again pushed into new high ground; the sales index number reaching 106.5 and the index number for production 111.2. This upward trend has continued without interruption since September 1933.

The methanol output showed signs of tapering off after its marked gains earlier in the year. The synthetic product advanced slightly but the index for crude production slipped off to 114.2 for August.

Consuming industries during October continued their comparative inactivity of the preceding month. Withdrawals of solvents and diluents were taken chiefly for near term requirements.

ACETONE USED IN NEW METHOD OF PRODUCING FATTY ACIDS

A new process for the production of fatty acids by the hydrolysis of fats has recently been patented. By the method, fat, water and a catalyst are brought into a common solution.

In the past, the most widely used method of effecting hydrolysis of fats with the aid of a catalyst was by the emulsification of fat and water. The new process uses an acetone solution of the fat, which will take up sufficient water so that when an inorganic acid, such as sulphuric, is added, the hydrolysis can be readily effected.

This procedure is reported to be much more rapid and efficient than the former method.

ATTENTION FOCUSED ON ANSOL PR AS BUYERS SEEK MOST SATISFACTORY LOW COST SOLVENT

Keen Competitive Conditions in the Lacquer Industry Have Increased the Demand for Low Cost, Low Viscosity Solvents

The exceptionally keen competitive conditions existing in the lacquer industry at the present time have made it more necessary for manufacturers of nitrocellulose lacquers to make full use of the advantages offered by ethyl acetate and anhydrous ethyl alcohol.

The advantages of these two important solvents are not restricted to the cost factor alone. When ethyl acetate and anhydrous ethyl alcohol are blended in the right proportions, they have a higher toluol tolerance and produce lower viscosity solutions than the more expensive ester solvents.

Ansol PR is blended to secure maximum utility of the latent solvent power of anhydrous ethyl alcohol. While anhydrous alcohol alone is not a solvent for R. S. Nitrocellulose, it becomes an active solvent when mixed with ethyl acetate. 99% Ethyl Acetate has a toluol dilution ratio of 3.0. 85% Ethyl Acetate, which contains 15% anhydrous alcohol, has a dilution ratio of 3.5. Ansol PR, which contains a still larger proportion of alcohol, has a toluol dilution ratio of 3.7.

The high dilution ratio of Ansol PR combined with the other prerequisites of low viscosity and mild odor make it ideally suited to modern lacquer formulation. The rapidly increasing use and popularity of Ansol PR is evidence of its commercial acceptance by the trade.

A Service Fulfilled

The following paragraph from a letter by Mr. C. F. McCartie of the Halowax Corporation illustrates the service SOLVENT NEWS is performing in keeping its readers informed on news and developments within the industry:

"It may be of interest to you to know that we have come across several interesting products which have been mentioned in your advertisements from time to time and that we have adopted the use of some of these materials."

Inquiries averaging more than a hundred a month, are received from the readers of SOLVENT NEWS, requesting additional information and sources of supply.

DETERMINING BLUSH RESISTANCE OF LACQUERS & LACQUER SOLVENTS

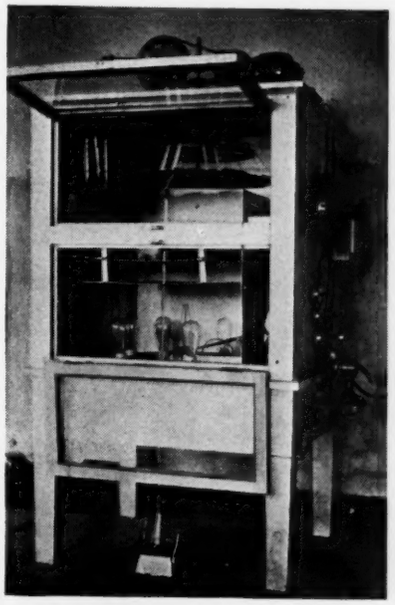
Blush resistance is one of the most important characteristics in the evaluation of nitrocellulose lacquer solvents. Unfortunately, however, there is at present no standard method for making this determination.

In order to be of assistance to SOLVENT NEWS readers, the method used in the laboratories of the U. S. Industrial Chemical Co., Inc., is given below. Very helpful suggestions received from the Sherwin-Williams Co. and others were used in writing the method and building the apparatus.

The test is carried out at a temperature of 90° F. and at a variation of 5% in relative humidity, in a cabinet capable of holding the temperature and relative humidity constant throughout the test.

Construction of Cabinet

The cabinet, as illustrated here, is about 3′ x 3′ x 3′, made of wood, lined with plaster board covered with a water resisting paint. Galvanized iron baffles are so placed that the cabinet is divided into a lower and an upper compartment with an air passage from the top compartment down to a six inch fan in the bottom compartment. Back of the fan is a ¾″ air inlet from the outside of the cabinet and in the upper part of the air passage are two ¾″ air outlets. In front of the fan is a pan containing water or sulphuric acid, as the case may require, over which the air is circulated to obtain the desired relative humidity. The temperature is maintained by electric light bulbs in the bottom compartment and controlled with a thermostat located in the upper compartment. A



BLUSH RESISTANCE CABINET

(Continued on next page)

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NOVEMBER ★ **SOLVENT NEWS** ★ 1934

NITROCELLULOSE LACQUER FILMS FOR DECORATING METAL WARE

Success in producing artistic effects on metal ware with the aid of nitrocellulose lacquer films is dependent primarily on the type of lacquer employed according to a recent article on the subject in a foreign technical journal. The method involves the cutting of fresh films of lacquer in such a manner that they may be peeled off where desired to produce a design by exposing the bare metal.

It is obvious that the films must be cut at a time during drying when they are neither too fresh to be cut or too hard to be pulled off the metallic surface. Lacquers employed for this purpose must be suitably composed to permit removal in a semi-dried condition and yet show excellent adherence after complete drying. While thick films come off better than do thin ones, a certain maximum thickness should not be exceeded.

A sharp knife is recommended for cutting, care being taken to avoid vertical or undercutting and striving to secure a facet-type cut to insure ease in pulling off the film without injuring the neighboring sections. Should cutting be carried out too late or be too long in operation a fresh lacquer film will soften the old one sufficiently to allow it to be removed. Final treatment includes baking at elevated temperatures or air drying; wet-grinding with silicon carbide paper; drying, and polishing.

DETERMINING BLUSH RESISTANCE

(Continued from preceding page)

wet and dry bulb thermometer is placed in the upper compartment to indicate the relative humidity of the circulating air.

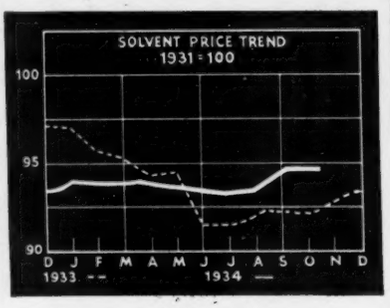
In the upper compartment is located a circular rack made of galvanized iron about two feet in diameter for the purpose of holding glass plates at an angle of about 60°, which is rotated at a rate of about 2 R.P.M. by a slow speed electric motor device mounted as shown in the illustration. In the top of the cabinet, a one inch hole is suitably located to permit pouring samples onto the glass plates by means of a pipette. The excess part of the sample that runs off the glass plate is allowed to pass through a funnel to the outside of the cabinet.

Procedure

R.S. ½ second nitrocellulose is air dried at room temperature over night and then dried for a half hour in an oven at 45°—50° C.

A 10% solution (by weight) is made from the dry nitrocellulose and the solvent to be tested.

When the air in the cabinet has been brought to the desired relative humidity and temperature, the nitrocellulose solution is poured on the glass plate and allowed to dry at the given relative humidity while the rack is being rotated. The films are then examined for blush and classified as clear, slight, medium and heavy blush.



SOLVENT PRICE TREND

Firmness ruled the market and price situation for solvents and diluents during the past thirty days. Few changes were recorded and the Solvent Price Index Number remained virtually unchanged at 94.95 for October 15th, compared with a revised index number of 94.87 for the 15th of September.

A new surface coating material for tanks which are to contain petroleum naphtha, oil or similar liquids is the subject of a recent British Patent. It is a composition of sodium and potassium silicates and chalk to which suitable fillers such as asbestos powder, clay, etc., may be added. The coating is hardened by heating, treating with carbon dioxide, or some other method to render it resistant to water as well as oil.

TECHNICAL DEVELOPMENTS

The moisture-proofness of sheet materials such as cellulose acetate or viscose sheeting, may now be measured by a new device. It consists of an aluminum vessel to be partially filled with water and a special clamp rim for securely fastening the sheeting across the opening. The vessel is then weighed and placed in position to secure constant circulation of air (accomplished by means of an electric fan). At intervals the vessel may be weighed to determine loss of moisture. Results are expressed in "Water vapor transmission rate" in "grams per 100 sq. in. per 24 hours."

U S I

A rubber base enamel which is claimed to be unusually resistant to salt, acid, alkalis, rust, etc., has recently been placed on the market. It is particularly recommended for "touch-up" work.

U S I

For the turpentine industry is a new glue lining machine with which a 55 gallon barrel may be coated in approximately 15 seconds—a fraction of the time required by the hand method. An electrically heated glue pot of 70 gallon capacity and a revolving spray which enters the barrel through the bung and through which the hot glue is forced coats the inside of the barrel with a brush-like effect.

U S I

A new mixing-machine with the body made of white acid-proof Porox is glazed inside and out. It is equipped with a direct driven motor agitator which can be easily and quickly removed for cleaning. It is acid-proof, easily kept clean, and will not contaminate the finest products. It is available in 5 and 10 gallon capacities.

U S I

An industrial pH meter combines in a single unit, all necessary equipment for making pH determinations and includes both antimony and quinhydrone electrodes. Readings are made directly in pH units on a hand calibrated scale which is readable to 0.02pH. The range over both types of electrodes is said to be from 0 to 12 pH. No standardization or balancing is necessary and determinations are unaffected by color or turbidity of the solution.

U S I

An aluminum paste is now available for use in paints. It is reported to offer certain advantages over the powdered pigment, particularly the coarser grades. More convenient to mix because it eliminates the loose powder flying about, the paste is said to dry to a very smooth finish which does not collect dirt readily and remains clean and bright. It is durable and will not easily rub off.

U.S. INDUSTRIAL ALCOHOL CO.
U.S. INDUSTRIAL CHEMICAL CO., INC.

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and it can be assumed that present crop and carryover this year will figure around 4,000,000 barrels. Although the oil crop year coincides with that of cotton, starting Aug. 1, some carryover is a necessity, since August, September and perhaps October use must be taken care of before new crop oil is available in quantity. August-September use of oil has been at the annual rate of over 5,000,000 barrels. This should not be expected to continue at that rate.

Nevertheless, practically no supplies will remain as a backlog for next season and if the government again restricts the next cotton crop to 10,000,000 bales there will be available but 185,000 barrels of oil per month for the '35 season (Nov. 1, '35-Oct. 31, '36). This is obviously well below the usual monthly consumption figure.

Extent of the gain in quotations in the October period may be seen in the following comparison:

	Close Sept. 29	Close Oct. 31	Last year
Nov.	8.10-.14	8.55*	4.35-4.50
Dec.	8.08	8.58-8.62	4.48-4.50
Jan.	8.09-.12	8.58-8.62	4.60-4.68
Feb.	8.10-.17	8.60-8.70	4.60-4.80
March	8.24	8.74†	4.77-4.79

* Bid; † sales.

Trend in price movements of the principal oils was decidedly mixed in the last 30 day period. Fats and oils index of the National Fertilizer Association shows a gain of 2.7 points between Sept. 29 and Oct. 27. Trading volume remains below normal and buyers continue to display a desire to hold to their policy of "watchful waiting" and limiting purchasing in the meantime to immediate needs. Hand-to-mouth buying leaves the market in a very uncertain state. Chinawood prices are easier when comparison is made with the end of September; coconut is off ⅛c, the prevailing price on the Coast in tanks as October closed being 2⅞c; perilla quotations are lower by about ¾c, new crop shipment figure is now reported 6.3c; tank price on the Coast is quoted nominally at 7¾c; peanut, crude, is off ¼c to 7¾c in tanks at the mills. Corn oil is somewhat higher, on the other hand, and the current market is 7¾c. In the fish group, refined menhaden grades remain firm after a ½c decline in the middle of the month followed by a corresponding advance a few days later. Crude is also in a strong position, as sellers are inclined to hold back on market offerings. Stearic acid quotations were advanced ½c in the 3rd week of the month.

Crushes Soy Beans

Spencer Kellogg will crush soy beans at its Des Moines plant where formerly linseed oil was produced.

Menhaden Season

Atlantic Fisheries' fishing season closed recently with an estimated catch for the period between June and October of 130,000 barrels of menhaden fish, according to reports from Lewes, Del.

The 8 fishing steamers chartered by the Lewes plant from the Menhaden Co., of Reedville, Va., have been returned to their owners, and plant will close down shortly for the year. Reported oil yield from the fish was between 5 to 6 gallons per barrel of fish. During the past few weeks fishing conditions have not been so good due to the advent of colder weather when the menhaden fish are driven from the coast where the steamers ply, though the smaller amount caught at this time of the year are said to be larger fish and richer in oils than those earlier in the season. The oil market for fish has been good in comparison with previous years. The season was considered profitable, despite the fact that a large part of the scrap will be carried over.

Consolidated Fisheries Co., whose plant is located in the same vicinity as the Atlantic Fisheries Co., will continue operations a few weeks longer.

'33 Lard Production

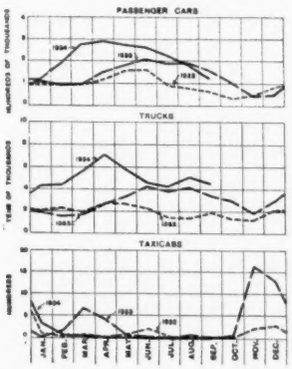
U. S. production of lard, oleo oil and similar products during '33 increased 100,984,771 lbs. over '31, but total value was $50,589,560 less than for the previous census year, according to preliminary data collected by the Bureau of the Census for the Census of Manufactures for 1934. This is an increase in poundage of more than 5%, but a decline in value of more than 30%.

	1933.	1931.
Lard—		
Pounds	1,870,585,162	1,749,797,684
Value	$102,351,805	$149,491,933
Oleo oil—		
Pounds	59,136,481	80,420,523
Value	$2,910,804	$4,676,954
Oleo stocks—		
Pounds	18,399,864	18,771,421
Value	$758,702	$1,012,910
Stearin (oleo and other)—		
Pounds	30,126,940	28,247,748
Value	$1,370,755	$1,851,606
Fertilizer materials—		
Tons	88,624	114,924
Value	$1,934,492	$2,882,715

Solvents, Petroleum Chemicals

¶ Demand For Solvents Declines—Important Price Revisions—Alcohol Firmer

Reduced operating schedules in automotive and tire centers were reflected in shipments of most of the solvents. It is thought that October production



For the first time this year automotive production declines below last—Bureau of the Census Chart.

of cars barely reached 170,000 units and November figure is expected to be under this total.

Price adjustments on several solvents, including a number of the important amyl compounds, were placed in effect in the middle of the month. After several months of comparative steadiness in the face of a generally weak market for most of the petroleum derivatives, market for solvents showed signs of wavering. Strangely, however, 1st break has taken place in the East where prices have remained steady and unchanged for a very long period. Petroleum thinners, V. M. & P. naphthas and Stoddard Solvent are down ½c in tankcars at Eastern refineries. In many quarters, a downward revision is looked for shortly in the Midcontinent market.

Important Price Changes

	Oct. 31	Sept. 30
ADVANCED		
Amylene, carload drums	$0.102	$0.10
Diamylene, carload drums	.095	.09
Dichlorpentanes, carload drums	.032	.0298
Isobutyl carbinol, carload drums	.33	.329
DECLINED		
Alcohol, amyl, tertiary, carload drums	$0.062	$0.082
Amyl chlorides, mixed, tech. carload drums	.07	.11½
tanks	.06	.10½
Diamylether, carload drums	.08½	.09
Naphthas, V.M.&P. East.	.09	.09½
Petroleum thinner, East...	.09	.09½
Stoddard solvent, East....	.09	.09½

Alcohol Firmer

Alcohol prices are firming up. Much higher level for glycerine is expected to increase use of C.D.5 for anti-freeze purposes this winter. Partly with this in mind, and also for other reasons, dealers are stocking up heavily. This generally firm state of affairs is exerting an influence on the prices of other industrial formulas.

Hydrogenated Naphthas

Hydrogenated naphthas are now quoted basis refinery with freight allowed to Eastern delivery points. Tanks are now quoted, No. 1, 17½c per gal; No. 2 22½c; No. 3, 17½c; No. 4, 22½c.

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Standard Quality

Blackscrap molasses sellers and all those marketing other materials used in producing alcoholic liquors must now keep detailed records of all sales.

Methanol Report

Monthly statistics on production of crude and synthetic methanol, compiled from data received by the Bureau of the Census and the Hardwood Distillation Industry Code Authority from 36 manufacturers, are presented. These statistics represent practically entire output of crude methanol and synthetic methanol in the U. S. Manufacturers included in Bureau's summary on methanol for December, '33, accounted for 78.9% of the crude methanol and 100% of the synthetic methanol shown below.

Month 1934	Production (Gallons) Crude [1]	Synthetic
January	360,822	979,686
February	337,983	690,961
March	366,052	916,872
April	342,307	754,980
May	324,063	897,294
June	298,165	922,551
July	256,136	939,439
August	253,612	951,834
Total (8 months)	2,539,140	7,053,617

[1] The refined equivalent would be approximately 82 per cent of the crude production.

Fertilizers

¶ Fall Sales in Good Volume—Little Demand for Raw Goods—Changes in International Trade

Fall fertilizer sales are reported in excellent volume, exceeding manufacturers' anticipations in most cases. Needless to say, producers are pleased.

If finished fertilizers are moving out well, the direct opposite is true of fertilizer materials. Markets for sulfate, nitrate, potashes and phosphates have passed through a particularly dull and lifeless 30 day period. Many of the organic ammoniates have drifted lower. Some interest is evinced in the fish scrap market as the menhadan season closed, but prices in the Baltimore market are still nominal and without much meaning as to possible future trend.

Buyers and sellers of fertilizer materials are planning to attend the Atlanta convention in large numbers and the present outlook is for a record attendance. Some impetus to trading may be given when the informal gatherings are held in conjunction with the convention.

September imports of fertilizer and fertilizer materials were 35% smaller than imports for September, '33, and 21% smaller than imports for September, '32. September marked the 4th consecutive month in which imports were smaller than the comparable month of '33. Exports of fertilizer materials for September were 11% smaller than exports for September, '33, but were 70% larger than exports for September, '32.

Materials that showed larger imports for September than for September, '33, were calcium cyanamid, urea and calurea, ammonium phosphates, "other nitrogenous materials," muriate of potash, 20% kainite, sulfate of potash, nitrate of potash, and "other fertilizers." Largest declines were shown in the receipts of nitrogenous and phosphate materials. Imports of potash materials were only slightly lower than imports for September, '33, and were slightly higher than imports for September, '32.

With the exception of "other nitrogenous chemicals" (chiefly domestic synthetic sodium nitrate), high grade hard rock, and concentrated chemical fertilizers, exports for September were decidedly lower than exports for September, '33.

Important Price Changes

ADVANCED

	Oct. 31	Sept. 30
Hoof meal, Chicago	$2.25	$1.90

DECLINED

Blood, dried, N.Y.	$2.65	$3.00
Chicago	2.90	3.25
imported	3.00	3.10
Bone meal, 1-¼ & 60-70	25.50	26.00
Tankage, N.Y., unground	2.25	2.50
ground	2.60	2.90

FERT. & FERT. MATERIALS

	Sept.	Aug.
Exports	$1,271*	$1,059*
Imports	$1,554*	$1,035*

* 000 omitted.

DEPT. OF LABOR INDICES

	Sept. '34	Sept. '33	Aug. '34
Employment	93.8b	82.3	72.5
Payrolls	78.6b	60.6	57.5
Fert. mat. prices	66.4	...	64.8
Mixed fert.	73.0	...	73.0

b Preliminary.

International Trade

International trade in fertilizers has been radically modified in recent years, according to C. C. Concannon, Chief of the Commerce Dept.'s Chemical Division. Among outstanding factors involved in this development have been depressed conditions prevailing in agriculture, falling price levels, and success achieved by many leading nations in the domestic production of fertilizers by synthetic processes.

Trend of nitrogen exports affords a striking example of these changed conditions. Twenty years ago Chile with its natural nitrate deposits obtained the largest share of this business, and in '30 still supplied more than 40% of the world's export demand, shipping abroad in that year nitrates valued at approximately $76,000,000. In the same year Germany's exports were valued at $47,000,000; England's $22,000,000; and Norway's $17,000,000. Exports from 3 latter countries consisted almost entirely of nitrogen produced by synthetic processes. Eight other countries accounted for exports valued at $24,000,000 in '30, of which the U. S. supplied $4,000,000, making a grand world total of $186,000,000 worth of nitrogen exports in that year.

By '33 world total had declined to about $60,000,000, less than one-third of the '30 figure, and Chile's share had fallen to $11,000,000, while Germany ranked in 1st place with exports valued at $13,000,000 and Norway exported an amount equal to that of Chile, according to a recent German compilation. Decreases of over two-thirds in the value of world exports of nitrogen was not shared uniformally by all participants, as on a volume basis several countries increased their trade compared with '30.

U. S. Potash Trade

U. S. potash fertilizer trade is featured during the current year by an appreciable decrease in domestic prices and an increase in imports, latter development due largely to heavier receipts from Russia and Spain.

Total potash imports during the January-August period of '34 amounted to 251,500 tons ($5,656,500) against 221,170 tons ($5,328,700) in corresponding period of last year. Receipts from Spain during '34 period of potassium chloride and potash manure salts increased to 63,900 tons ($1,460,800), compared with 59,400 tons ($1,255,100), in first 8 months of '33 and 15,800 tons ($845,700), in January-August period of '32.

Imports of potash from Russia during first 8 months of the current year amounted to 10,200 tons ($263,850), compared with only 110 tons, valued at $3,860, for entire year '33, while imports of crude potassium nitrate from Chile in the 8-month period of '34 amounted to 8,260 tons compared with 14,387 tons and 4,315 tons, respectively, in the full years '33 and '32.

Personnel

C. M. Harris, formerly general manager at the Carlsbad mines of the Potash Co. of America, is now associated with President Smith at the Baltimore sales offices of the company.

E. B. Pinkerton, former Miller Fertilizer V.-P., is now in charge of Standard Wholesale Phosphate & Acid Wks.' re-

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tail distribution with a title of vice-president.

R. A. Payne, Potash Export My., Inc., is now in charge of New England, Eastern N. Y. and Northern N. J. sales and agricultural activities.

J. R. Pratt, for several years division manager of Armour at Montgomery, Ala., resigns position. A native of Alabama, Mr. Pratt rose from bookkeeper to the position of general manager for South Alabama. R. A. Ellington, salesman at the Montgomery office, succeeds Mr. Pratt as manager.

Davison Chemical has recently made additions to the executive organization at its Baltimore office. James R. Rossman, president of Berkshire Fertilizer, and William Geoghegan, president of Davison-Peck, have been transferred to the Baltimore office of the Davison Co.

Each man will continue as directing head of his present company, which is a Davison subsidiary, and also will be given added duties in the Davison management. Both Mr. Rossman and Mr. Geoghegan have been connected with the fertilizer industry for many years.

George A. Holderness, formerly president, V. C., resigns as director.

Personal Notes

C. Wilbur Miller, former Davison Chemical president, is a close second to winner of the Republican nomination for U. S. senator in Maryland.

Spencer L. Carter, V.-C. vice-president, is convalescing at Stuart Circle Hospital, Richmond.

W. J. O'Shaughnessey, treasurer and director of Cotton States Fertilizer, now makes his home in Macon, Ga. He had resided in Middleport, N. Y., for several years.

New Buying Group

Fertilizer Industries, organized last May by a group of fertilizer manufacturers who are also members of the Independent Fertilizer Manufacturers' Association, opens a New York office at 70 Pine st. Omar Sanders, who was associated with Armour Fertilizer for many years, is manager of the office. Fertilizer Industries is sponsored by 8 manufacturers, and it was organized to facilitate group purchasing where such is thought possible.

Oscar F. Smith, Smith-Douglas, Norfolk, is president; Henry S. Parsons, Nitrate Agencies, New York, vice-president; and Bayless W. Haynes, Wilson-Toomer, secretary-treasurer.

American Potash & Chemical opens Baltimore office (Baltimore Trust Bldg.) with E. M. Kolb in charge. L. M. Vogle heads an Atlanta office.

AAC's stockholders reelect directors and approve retirement of 84,669 shares of common now held in the treasury.

William E. Wellmann, Baltimore fertilizer broker, makes arrangements to specialize in Japanese feeds, fish meal, and related materials, in addition to lines already handled.

Employment

September employment in the fertilizer industry was about 30% greater than for August and about 14% above for September, '33. Pay-roll totals for September were 37% larger than for August, and about 30% higher than for September, '33. Ordinarily, there is an upward movement in this industry at this season of the year. There was an unusually sharp upturn last fall.

Miscellaneous Items

Potash and inorganic nitrogen importers are exempt from trade practice provisions of the importing code because of the inability of importers and sellers of domestic materials to agree on a common set of trade practices.

California Fertilizer Association holds successful annual meeting at the Drake in San Francisco, Oct. 29 and 30. Captain Battley, NRA, and N.F.A.'s Brand were speakers.

Victor Fertilizer of Chester, S. C., is a new company in the field.

Naval Stores

¶ Higher Loan Rate Sends Turpentine To Higher Levels—Sales Are Slow

Naval stores markets were generally dull during the past month. Rosin prices fluctuated within very narrow limits, but turpentine registered a decided gain. As the month closed, sellers were asking 48c at Savannah, while buyers were offering 45c. This represents a net gain of several cents above the 41¼c price prevailing on Sept. 29. Rise was directly attributed to announcement that government loans to producers of naval stores were to be increased. New basis is $50 per unit against the former $40.

Control Committee held a meeting last month for the purpose of fixing allotments, but considerable objections were voiced and further meetings were considered necessary. Speculation is rife as to what final total will be. In certain quarters it is contended that it will not exceed the 350,000 units 1st adopted for the present season, but which was increased by about 100,000 units after a storm of disapproval. Others feel that 350,000 units is too low a figure and will lead, if adopted, to all sorts of difficulties.

Savannah rosin prices at the end of October compare as follows with those prevailing at the end of September. In each case net loss or gain is shown.

	Sept. 29	Oct. 31	Net Gain or Loss
B	$4.10	$4.10	—
D	4.20	4.15	—$0.05
E	4.20	4.20	—
F	4.20	4.25	+ .05
G	4.25	4.30	+ .05
H	4.25	4.45	+ .20
I	4.30	4.45	+ .15
K	4.30	4.47½	+ .17½
M	4.35	4.50	+ .20
N	4.60	4.65	+ .05
WG	4.90	5.00	+ .05
WW	5.15	5.25	+ .10
X	5.25	5.25	—

September production of naval stores by steam distillation and solvent treatment of wood and stocks of these products on hand Sept. 30, according to data collected by producers' committee, Arthur Langmeier, of Hercules, secretary, were as follows:

PRODUCTION

	Rosin, 500-lb. barrels	Turpentine, 50-gal. barrels	Pine Oil gallons
Month of September	43,095	6,798	292,555
Total from April 1, '34	255,368	41,428	1,762,512

STOCKS AT PLANTS

Total September 30, '34	108,933	19,817	.....
March 31, '34	89,963	19,253	.....
Change	+18,970	+564	.....

Note—Rosin production and stocks include all grades of wood rosin.

DEPT. OF LABOR INDICES

	Sept. '34	Sept. '33	Aug. '34
Employment	96.2	97.6	98.3
Payrolls	52.2	43.3	51.3
Exports, naval stores, gums, resins	$1,327*	$1,276*	

* 000 omitted.

Stocks continue to accumulate at ports. Comparison of stocks at Savannah and Jacksonville on Sept. 29 and Oct. 31 follows:

STOCKS OF ROSIN

	Savannah	Jacksonville
Sept. 29	135,897	85,641
Oct. 31	135,098	105,017
Net gain or loss	—799	+19,376

STOCKS OF SPIRITS TURPENTINE

Sept. 29	11,802	35,574
Oct. 31	17,515	42,931
Net gain or loss	+5,713	+7,357

Shellac Lower

Shellac prices both locally and in Calcutta and London lost ground in October. No basic change in the market situation has taken place. Demand is poor.

	Sept. 29	Oct. 31	Net loss or gain
Shellac, Bone dry	$0.32	$0.30	—$0.02
Garnet	.26	.26	....
Superfine	.28	.25	— .03
T.N.	.26	.22	— .04

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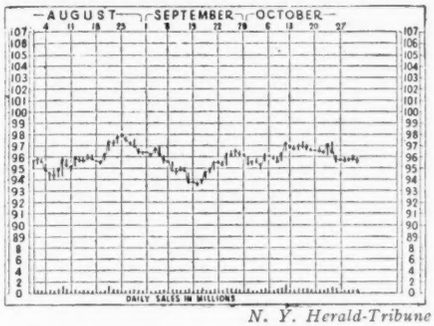
The Financial Markets

¶ ***Although General Market Declined, Chemical Group Shows Gain in October***

The stock market continues in the doldrums. Turnover is very discouraging, and the general apathy on the part of the public remains unchanged. Price movements in the past 30 days

Daily Record of Stock Market Trend



N. Y. Herald-Tribune

have been small. October witnessed a slightly greater loss in values in the complete list, total value of 1,188 issues totaling $31,613,348,531 on Nov. 1 as against $32,319,514,504 on Oct. 1, a net loss of $706,165,973, as compared with a net loss of $298,616,158 in September.

Against General Trend

Chemical stock values moved against the general trend in October, making a net gain. Value of chemical shares on the N. Y. Stock Exchange on Nov. 1 totaled $3,614,359,873 as against $3,521,240,667 on Oct. 1, a net gain of $93,119,206. In September the chemical list slipped off, recording a net loss of $6,054,901. Generally speaking, chemical stocks have been in good demand and from the Street reports come of a lot of switching into the chemical group at the expense of the rails and other industrial groups. In comparison to other divisions of industry, activity in chemical manufacturing is being maintained at a fairly high and satisfactory rate. This is particularly so of the fertilizer group. Sales at this time of the year are better than anticipated and many in the Street are reported bullish on the prospects of the fertilizer business next Spring.

Most of the important chemical companies have reported on 3rd quarter earnings and also totals for the 9 months period. It is difficult to generalize, but in the majority of cases 3rd quarter earnings were not as good as in the 2nd quarter, while totals for the 1st 9 months of '34 exceed those for the same period last year. Comparison with the 3rd quarter of '33 is beset with inconsistencies; in some cases the net is better, in others substantial declines are noticed. Summary of earnings is given on the next page, and a more detailed review of some of the more important earnings statements.

DuPont Earnings Rise

Du Pont reports for 9 months ended on Sept. 30 a net profit of $38,727,818, or $3.10 a share, on 11,059,692 common shares outstanding, average number for the period. This compares with $26,437,238, or $1.98 a share, on 10,961,479 shares in the corresponding period of last year, showing an increase of $1.12 a share.

Earnings for this year included dividends from comany's investment in the General Motors equivalent to $1.13 on each share of du Pont common stock, compared with 68½c in first 9 months of last year.

Third Quarter, $1.24 Net

For the third quarter of this year net profit was $15,174,220, or $1.24 a share, including a dividend from the General Motors equivalent to 68c a share on the du Pont common stock. In 2nd quarter of this year total earnings were 96c a share on the du Pont stock, including a dividend from General Motors equivalent to 22½c a share. In 3rd quarter of 1933 total earnings were $11,981,980, or 95c a share, on the du Pont stock, including a dividend from the General Motors investment equivalent to 22½c a share on the du Pont common stock. Income account for the third quarter follows:

	Three Months Ended Sept. 30 1934	1933
Income from oper. before deprec. and obsol.	$10,267,260	$12,342,407
Deprec. and obsol.	3,418,262	3,218,736
Net inc. from oper.	$6,848.998	$9,123,671
Income from marketable secur. and misc. invest.	1,816,722	1,746,962
Total	$8,665,720	$10,870,633
Federal income tax	975,398	1,370,590
Net income	$7,690,322	$9,500,043
Income from investment in General Motors Corporation	7,498,085	2,499,362
Net income	$15,188,407	$11,999,405
Interest on bonds of subsidiary company	14,187	17,425
Net income	$15,174,220	$11,981,980
Less—Dividends on debenture stock	1,639,396	1,637,262
Consolidated earnings applicable to common stock	$13,534,824	$10,344,718
Including E. I. du Pont de Nemours & Co.'s equity in undivided profits or losses of controlled companies not consolidated, amount earned on common stock is	$13,760,387	$10,447,092
Average number of shares of common stock outstanding during the period	11,055,711	11,048,311
Amt. earned a share	$1.24	$0.95

Mathieson Alkali

Mathieson reports for quarter ended Sept. 30, '34, net income of $278,311, after depreciation, depletion, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to 29c a share on 829,758 shares of no-par common stock outstanding at end of period. This compares with $339,797 or 37c a share on 795,368 common shares in preceding quarter and $415,667 or 60c a share on 623,283 shares in September quarter of previous year.

For 9 months ended Sept. 30, last, net income was $895,736 after charges and taxes, equal to 93c a share on 829,758 common shares, comparing with $919,350 or $1.27 a share on 623,283 common shares in first 9 months of '33.

Hercules Powder

Hercules Powder reports for 9 months ended Sept. 30, '34, net profit of $2,439,288 after depreciation, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to $3.23 a share on 583,046 average number of no-par shares of common outstanding during the period. This compares with $1,731,015 or $2.02 a share on 582,679 common shares in first 9 months of previous year.

For quarter ended Sept. 30, '34, net profit was $637,807 after charges and taxes, equal to 77c a share on common comparing with $928,555 or $1.28 a common share in preceding quarter and $837,964 or $1.12 a share on common in September quarter of previous year.

Price Trend of Chemical Company Stocks

	Close Sept. 29	Oct. 5	Oct. 11	Oct. 19	Oct. 26	Close Oct. 31	Net change	1934 High	1934 Low	1933 High	1933 Low
Allied Chem..	126	126¾	131	130⅛	127¼	127	+1	160¾	115⅛	152	70¾
Air Reduction	101¼	103	105¾	104	101¾	103⅞	+2⅝	107	91¾	112	47½
Anaconda ...	11⅝	11	11⅝	11	10½	10⅞	—1¼	17¾	10	22⅞	5
Col. Carbon..	67½	67¾	68½	68⅜	67½	66¼	—1¼	77¼	58	71½	23⅛
Com. Solvents	20⅜	20⅛	20½	19¾	18½	18¼	—2⅛	36¾	15¾	57¾	9
du Pont	90⅞	91½	93½	93¼	90½	92¼	+2¼	103⅞	80	96⅜	32⅛
Mathieson ...	26⅜	27⅜	27½	26	24¼	24⅛	—2¼	40¾	23½	46⅝	14
Monsanto ...	53⅞	53¼	54½	53⅝	54	55⅛	+1⅛	56½	39	83‡	25‡
Std. of N. J.	43½	42⅝	43	40½	39⅜	40⅜	—3⅛	50⅛	39¼	47½	22¾
Texas Gulf S.	36½	37⅞	37⅝	37¾	36½	36½	.....	43¼	30	45¼	15¼
U. S. I.....	36	37	37⅞	38⅝	36¾	37	+1	64¾	32	94	13½

‡ Old stock.

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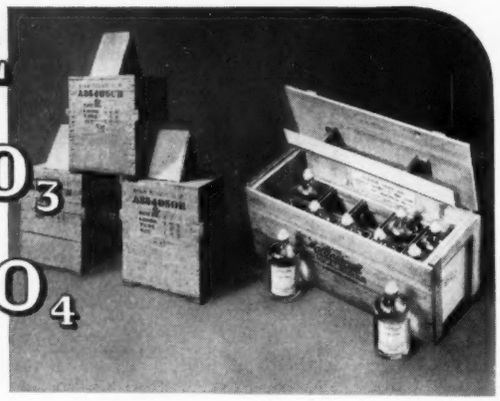

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ACID NITRIC A.R.	Chloride 0.00007%	Sulphate 0.0002%
ACID SULPHURIC C.P.	Arsenic 0.000005%	Total Nitrogen (NH_4+NO_3) 0.0009%
ACID SULPHURIC A.R.	Arsenic 0.000003%	Total Nitrogen (NH_4+NO_3) 0.0003%

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Latest Earnings Reports Summarized

Company:	Annual dividends	Net income 1934	Net income 1933	Common share earnings 1934	Common share earnings 1933	Surplus after dividends 1934	Surplus after dividends 1933
Air Reduction Co.:							
September 30 quarter.....	§$3.00	$866,383	$1,037,402	$1.04	$1.23	*.....	*.....
Nine months, September 30	§3.00	3,077,199	2,137,324	3.70	2.54	*.....	*.....
Atlas Powder Co.:							
September 30 quarter.....	k1.50	248,509	307,782	h.49	h.74	*.....	*.....
Nine months, September 30	k1.50	925,616	437,039	h2.19	h.17	*.....	*.....
Commercial Solvents Corp.:							
September 30 quarter.....	.60	612,756	642,317	.23	.24	*.....	*.....
Nine months, September 30	.60	1,850,493	1,279,365	.70	.48	*.....	*.....
du Pont de Nemours & Co., E. I.:							
September 30 quarter.....	§2.60	15,174,220	11,981,980	j1.24	j.95	$820,714	$4,820,604
Nine months, September 30	§2.60	38,727,818	26,437,238	j3.10	j1.98	8,373,708	5,094,281
General Printing Ink:							
September 30 quarter.....	§.60	121,216	145,142	.36	.47	*.....	*.....
Nine months, September 30	§.60	477,542	300,886	1.71	.69	*.....	*.....
Monsanto Chemical Co.:							
September 30 quarter.....	§1.00	566,195	680,757	.65	.78	.....	.....
Nine months, September 30	§1.00	1,945,230	1,519,704	2.25	1.76	.....	.....
Sherwin-Williams Co.:							
Year, August 31	3.00	4,269,499	3,178,678	5.29	3.54	.....	.....
Union Carbide & Carbon Corp.:							
September 30 quarter.....	k.95	4,352,156	4,603,663	.48	.51	*.....	*.....
Nine months, September 30	k.95	13,469,600	8,904,873	1.49	.99	*.....	*.....
Westvaco Chl'ne Products Corp.:							
September 30 quarter.....	.40	138,799	125,191	.35	.30	*.....	*.....
Nine months, September 30	.40	451,863	324,789	1.18	.74	*.....	*.....

§ Plus extras; * Not available; k Declared during the year 1934; h On shares outstanding at close of respective periods; j On average shares.

Aldridge on T.G.S. Profits

Walter H. Aldridge, Texas Gulf Sulphur, in his report to stockholders for 3 months ended with September, states "company made net earnings of $1,899,155, approximately 75c a share on 2,540,000 shares outstanding at Sept. 30, this being equivalent to approximately 49½c a share on 3,840,000 shares now outstanding. This result is subject to adjustment at the end of the year, when the accounts are finally audited."

"With this amount added," he continued, "company's surplus, without deduction of any depletion at Sept. 30, was $32,427,734 after having paid a dividend of $1,270,000 on Sept. 15."

For corresponding quarter last year company showed a net profit of $2,611,362, after depreciation, Federal taxes and other charges, but before depletion. This was equal to $1.03 a share on 2,540,000 shares then outstanding.

"Account hitherto titled 'reserve for Federal taxes, uncertain accounts, miscellaneous and contingent liabilities' will be changed in future financial statements of the company," Mr. Aldridge's statement continued. "As of June 30, the part of this account representing current tax accruals, $522,428, was transferred to an appropriately titled account under current liabilities; the remainder of the account, $2,371,692, was titled 'contingent, miscellaneous, exploration and other reserves'.

"This balance of $2,371,692, plus the balance of $9,678,464 in the 'reserve for depreciation of plants, buildings, machinery and equipment and for amortization of unmineralized land values', made a total of $12,050,157 at June 30, which total was increased during the 3 months ended Sept. 30 by $279,788, making the total of these combined reserves $12,329,945 at Sept. 30."

Other important earnings statements released in the past month include:

Monsanto Chemical and Subsidiaries—Nine months ended Sept. 30: Net profit after depreciation, Federal taxes and other charges, $1,945,230, equal to $2.25 a share on 864,000 $10 par capital shares, after giving effect to 100% stock distribution this year. This compares with $1,519,704, or $1.76 a share, last year. Quarter ended Sept. 30: Net profit, $566,195, or 65c a share on 864,000 shares, compared with $704,918, or 81c a share, in previous quarter, and $680,757, or 78c a share, in 3rd quarter of '33.

Commercial Solvents —For nine months ended Sept. 30: Net profit, after depreciation, Federal taxes and other charges, $1,850,493, equal to 70c a share on 2,635,978 no-par common shares, against $1,279,365, or 48c a share on 2,635,684 shares last year. Quarter ended Sept. 30: Net profit $612,756, or 23c a share on 2,635,978 shares against $602,733, or 23c a share on 2,635,957 shares, in preceding quarter, and $642,317, or 24c a share on 2,635,684 shares, in 3rd quarter of '33.

Consolidated Chemical Industries, and Subsidiaries—Nine months ended Sept. 30: Net income, after depreciation, taxes and other charges, $350,140, equal, after Class A dividend requirements, to $1.24 a share on 80,000 Class B shares, against $302,295, or 90c a common share, last year. Quarter ended Sept. 30: Net income, $91,620, or 16c a common share, compared with $142,243, or 49c a share, in preceding quarter, and $126,885, or 63c a share, in 3rd quarter of '33.

Atlas Powder and Subsidiaries—Nine months ended Sept. 30: Net profit, after depreciation, Federal taxes and other charges, $925,616, equal, after 6% preferred dividends, to $2.19 a share on 249,978 no-par common shares, excluding 11,460 shares held by company, compared with $437,039, or 17c a share on 241,190 common shares, last year. Quarter ended Sept. 30: Net profit, $248,509, or 49c a share on 249,978 common shares, compared with $322,472, or 78c a share on 249,978 common shares, in previous quarter, and $307,782, or 74c a share on 241,190 common shares, in 3rd quarter of '33.

Air Reduction Company, Inc.—Quarter ended Sept. 30: Net profit after expenses, estimated Federal taxes and other charges, $866,383, equal to $1.04 a share on 832,588 shares of capital stock, excluding 8,700 shares in treasury, compared with $1,037,402, or

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933

Of Chemical Industries, published monthly at East Stroudsburg, Pa.

State of New York, County of New York, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Williams Haynes, who, having been duly sworn according to law, deposes and says that he is the Publisher of Chemical Industries, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Williams Haynes, 25 Spruce St., New York, N. Y.; Business Manager, William F. George, 25 Spruce St., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Chemical Markets, Inc., 25 Spruce St., New York, N. Y.; Williams Haynes, 25 Spruce St., New York, N. Y.; William F. George, 25 Spruce St., New York, N. Y.

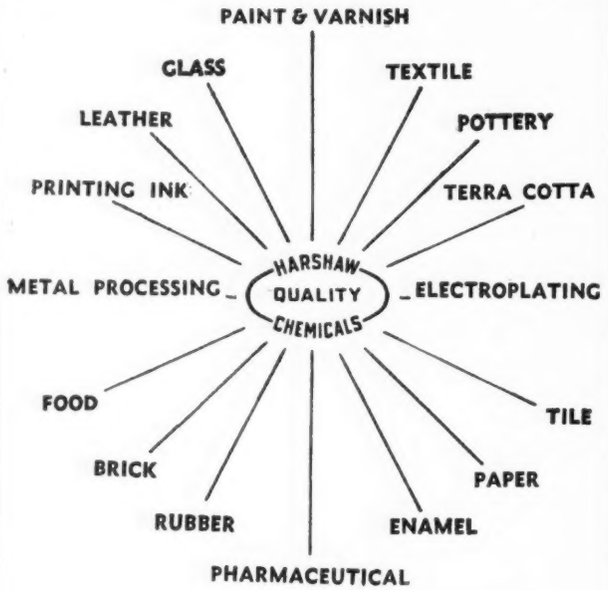
3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ——. (This information is required from daily publications only.)

Williams Haynes, Publisher.

Sworn to and subscribed before me this 29th day of September, 1934. Thomas A. Creegan, Notary Public, Kings County. New York Co. Clerk's No. 105; New York Co. Register's No. 5C60. (Comm. expires March 30, 1935.)



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4. Price Statistics—the high and low for 1932 and 1933 on over 1200 different chemicals and raw materials.

5. Trade and Technical Associations—a complete list with their executive officers and their addresses.

$1.23 a share, in 3rd quarter of '33. Earnings for the first 9 months of '34 were $3.70 a share, against $2.54 a share in same period last year.

Darco Corporation (controlled by International Carbon Corporation), including Darco Sales Corporation—Six months ended June 30: Net income after depreciation and other charges, $11,413.

International Carbon Corporation (controlled by Atlas Powder Company) and Subsidiaries—Six months ended June 30: Net income after depreciation and other charges, $10,791, equal to 70c a share on 15,400 8% preferred shares.

Monsanto Reports Financing

Monsanto Chemical notifies N. Y. Stock Exchange that its British subsidiary has offered for public subscription 400,000 shares of 5½% redeemable cumulative preference shares at 20s 6d a share. As a preliminary to the transaction, a new corporation was formed, Monsanto Chemicals, Ltd., with an authorized capital of 500,000 shares 5½% preferred, and 600,000 ordinary shares. Wholly-owned British subsidiary called Monsanto Chemical Works, Ltd., has changed its name to Monsanto Holdings, Ltd., and transferred all its business and assets to Monsanto Chemicals, Ltd., in exchange for all of the 600,000 ordinary shares of this company.

American I. G. Dividend

American I. G. Chemical directors declares an initial dividend of $2 a share on corporation's common A shares and 20c a share on common B shares. Since its organization, in '29, corporation's earnings have consistently exceeded interest requirements on its bond issue.

Action was forecast at the stockholders' meeting on June 12, when the chairman stated: "This company, while earning 1.88 times its bond interest, has declared no dividends. If, however, present favorable conditions and tendencies continue it might be clearly part of wisdom for your board of directors later in the current fiscal year to consider the beginning of dividend payments on the common."

Monsanto's 25c Extra

Monsanto Chemical declares extra dividend of 25c and also regular quarterly dividend of 25c on the capital stock, both payable Dec. 15 to stock of record Nov. 24.

Chemical Bond Values

Total market value of all chemical company bonds listed on the N. Y. Stock Exchange amounted to $86,793,333 and the average price was $89.97, as of Oct. 1.

Dividends and Dates

Name	Div.	Stock Record	Payable
Allied Chem. & Dye	$1.50	Oct. 11	Nov. 1
Amer. Smelt. & Ref. 7% 1st pf.	$1.75	Nov. 9	Dec. 1
Amer. Smelt. & Ref. 7% 1st pf. acc.	$2.50	Nov. 9	Dec. 1
Archer-Daniels-Midland pf.	$1.75	Oct. 20	Nov. 1
Atlas Powder pf.	$1.50	Oct. 19	Nov. 1
Bon Ami Co. Cl. A	$1.00	Oct. 15	Oct. 30
Canadian Industries Ltd. Com. A	$1.00	Sept. 29	Oct. 31
Canadian Industries Ltd. Com. B	$1.00	Sept. 29	Oct. 31
Colgate-Palmolive-Peet	12½c	Nov. 8	Dec. 1
Colgate-Palmolive-Peet ext.	25c	Nov. 8	Dec. 1
Commercial Solvents	30c	Dec. 1	Dec. 31
Consol. Chem. Indust. Cl. A	37½c	Oct. 15	Nov. 1
Dow Chemical	50c	Nov. 1	Nov. 15
Dow Chemical pf.	$1.75	Nov. 1	Nov. 15
Freeport Texas 6% pf.	$1.50	Oct. 15	Nov. 1
Freeport Texas	50c	Nov. 15	Dec. 1
Freeport Texas pf.	$1.50	Jan. 15	Feb. 1
Int'l Nickel pf.	$1.75	Oct. 2	Nov. 1
Int'l Printing Ink spec.	25c	Oct. 15	Nov. 1
Int'l Printing Ink pf.	$1.50	Oct. 15	Nov. 1
Liquid Carbonic	25c	Oct. 17	Nov. 1
Monsanto Chem.	25c	Nov. 24	Dec. 15
Monsanto Chem. ext.	25c	Nov. 24	Dec. 15
National Carbon pf.	$2.00	Oct. 19	Nov. 1
National Lead pf. A	$1.75	Nov. 30	Dec. 15
National Lead pf. B	$1.50	Oct. 19	Nov. 1
N. J. Zinc	50c	Oct. 20	Nov. 10
Owens Illinois Glass	$1.00	Oct. 30	Nov. 15
Shawinigan W.-P. com.	12c	Oct. 25	Nov. 15
Sherwin-Williams com.	75c	Oct. 31	Nov. 15
Sherwin-Williams pf.	$1.50	Nov. 15	Dec. 1
Solvay Amer. Investment pf.	$1.37½	Oct. 15	Nov. 15
Westvaco Chlorine Prods.	10c	Nov. 15	Dec. 1

ANNUAL AND SPECIAL MEETINGS

	Record Date	Meeting Date
Liquid Carbonic	Nov. 15	Dec. 6
Spencer Kellogg & Sons	Oct. 15	Nov. 12
Texas Gulf Sulphur	Oct. 27	Nov. 27

Montecatini Raises Capital

Montecatini is raising its capital from 500 to 600 million lire. One million fully-paid shares will be issued and distributed free in the proportion of one new share for every 5 held.

Lautaro Bond Holders

Committee, headed by Willard V. King, as chairman, formed on behalf of holders of the $32,000,000 first mortgage 6% convertible bonds, 1954, of Lautaro Nitrate Co., Ltd., in a communication to bondholders asks power of attorney to act in their behalf until such time as a reorganization plan may develop.

Letter draws attention to the effective organization of other interests in the company, interests necessarily in some instances "not running parallel to the interests of the dollar bondholders," and for that reason urges equally effective support by dollar bondholders who will be free to withdraw from any reorganization plan without expense or to accept its terms. In this way the bondholder will retain possession of his bond while the committee conducts discussions with other interests and then considers and reports "what further steps are desirable."

Some improvement is noted by the committee this year in the Chilean nitrate industry generally; estimates of sales are placed at 1,010,000 metric tons, compared with 801,531 in 1932-33 and 790,379 in 1931-32.

Other members of the committee are Lee Ashcraft, Atlanta, Philip L. Reed, Chicago, Victor Schoepperle and B. A. Tompkins, N. Y. City.

V.-C. Answers Suit

That Virginia-Carolina Chemical had a surplus of $1,458,277 on June 30 last, as alleged by George S. Kemp and other stockholders, was denied Nov. 7 by the $35,000,000 corporation in its answer to their suit filed to compel payment of dividends.

A. L. Ivey, company's general counsel, denied also that acts of directors had been oppressive to stockholders, as the $6,788,277 in dividends paid since incorporation and through last June exceeded actual net earnings and caused a deficit of $897,360.

Plaintiffs contend that the corporation had a large cash balance and should pay dividends to the 7% prior preference stockholders from earnings in the last quarter of the 1933-34 fiscal year. Unpaid dividends now amount to 17½%.

Over the Counter Prices

	Aug. 31		Oct. 3		Oct. 31	
Am. Hard Rubber	5¼	8	5¼	8	5	8
Canadian Celanese, com.	16½	18¼	15¼	17¾	20¼	23¼
Canadian Celanese, pfd.	107½	110½	107½	110½	118	122
Dixon Crucible	42	47	38	44	39½	44
Merck, pfd.	123	127	122	125	125	127
Tubize Chat., 7% cum. pfd.	54	57	44½	47½	37	41
Worcester Salt	42½	47½	44	49	45	49
Young, J. S., pfd.	100	.....	100	.....	100⅞	.....
Young, J. S., com.	72	.....	72¼	.....	72½	.....

Foreign Markets

	Aug. 31	Oct. 3	Oct. 31
London			
British Celanese	10s 9d	12s	10½d
Celanese	£4	£4¾	£5¼
Courtaulds	46s 4½d	47s 4½d	45s 10½d
Distillers	88s 9d	.....	91s
I. C. I.	37s	36s 10½d	34s 10½d
Unilever, ord.	22s	23s	22s 3d
Un. Molasses	19s 6d	21s 7½d	19s 4½d
Paris			
Kuhlmann	...	...	481
L'Air Liquide	690	590	590
Berlin			
I. G. Farben	148	144	141
Milan			
Snia Viscosa	274½	271½	...
Montecatini	158	168	136

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Tennessee Corporation Lockland, O.

The Industry's Securities

1934 Oct. Last	1934 Oct. High	1934 Oct. Low	1933 High	1933 Low	1932 High	1932 Low	Sales	Stocks	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1933	Earnings $-per share-$ 1932
							Number of Shares						
NEW YORK STOCK EXCHANGE							1934	October					
103⅞	107	91¼	112	47½	63½	30⅞	170,600	20,400	Air Reduction	No	841,288	$3.00*	3.79	2.73
127	160¾	115⅛	152	70¾	88¼	42½	255,600	11,300	Allied Chem. & Dye	No	2,214,099	6.00	5.50	3.62
125	130	122⅛	125	115	120†	96½	9,100	1,100	7% cum. pfd.	100	345,540	7.00	42.24	29.12
43½	44½	25¼	35	7¼	15½	3½	193,500	11,200	Amer. Agric. Chem.	100	315,701	2.00	p4.19	—p1.61
26½	62½	20¾	89⅞	13	27	11	518,500	20,100	Amer. Com. Alcohol	20	260,716	None	4.56	3.01
34¼	36	26¼	29¼	9¾	15½	7	95,400	4,900	Archer-Dan-Midland	No	541,546	1.00	p3.82	p1.79
44⅝	55½	35¼	39⅛	9	25½	7	77,400	4,000	Atlas Powder Co.	No	234,235	2.00	.74	—2.06
103¾	103¾	83	83⅛	60	79½	45½	6,020	190	5% cum. pfd.	100	88,781	6.00	8.38	.47
26¼	44⅞	17⅛	58⅞	4½	12⅝	1¼	1,158,500	154,800	Celanese Corp. Amer.	No	987,800	None	3.32	— .95
16	18⅝	9⅜	22⅜	7	31½	10¼	717,600	34,500	Colgate-Palm.-Peet	No	1,985,812	.50	— .57	— .74
97½	97½	68½	88	49	95	65	12,600	800	6% pfd.	100	254,500	6.00	1.51	.21
66¼	77¼	58	71½	23⅛	41⅞	13½	293,700	11,400	Columbian Carbon	No	538,154	3.40	2.17	1.83
18¼	36¾	15¾	57¼	9	13¾	3½	2,460,700	81,000	Commer. Solvents	No	2,635,371	.60	.88	.51
63½	84½	55½	90⅝	45⅜	55⅜	24¾	334,900	22,300	Corn Products	25	2,530,000	3.00	3.87	2.77
143⅜	148½	135	145¾	117½	140	99½	7,900	800	7% cum. pfd.	100	243,739	7.00	46.02	35.05
42⅛	55⅛	29	33⅞	10	16¾	7	72,600	2,400	Devoe & Rayn. A	No	95,000	h1.00	3.82	—r1.00
92¼	103⅞	80	95⅞	32⅛	59¾	22	1,332,000	76,300	DuPont de Nemours	20	10,871,997	2.60	2.93	1.81
125½	127	**115**	117	97½	105⅞	80¼	18,100	3,100	6% cum. deb.	100	1,092,699	6.00	35.58	24.00
105½	106⅜	79	89¾	46	87¾	35¼	200,000	18,000	Eastman Kodak	No	2,250,921	4.00	4.76	2.52
142¼	147	120	130	110	125	99	2,520	590	6% cum. pfd.	100	61,657	6.00	180.34	98.27
26⅝	50⅜	21½	49⅜	16⅛	28⅜	10	294,800	20,600	Freeport Texas	10	784,664	2.00	3.01	2.75
115	160⅛	113½	160⅛	97	...	...	2,800	100	6% conv. pfd.	100	25,000	6.00	156.73	...
22	28⅜	15⅜	20	3¾	10⅜	3⅛	733,200	14,700	Glidden Co.	No	603,304	1.00	1.54	—s.06
104½	104¾	83	91½	48	76	35	12,905	690	Glidden, 6% pfd.	100	63,044	7.00	22.60	7.85
79¼	96⅞	74	85⅞	65	...	...	45,600	4,600	Hazel Atlas	25	434,409	5.00	6.22	4.68
70	81⅝	59	68⅝	15	29½	13⅞	86,700	3,800	Hercules Powder	No	582,679	3.00	2.79	.24
123½	125	111	110⅛	85	95	70½	4,380	700	7% cum. pfd.	100	105,765	7.00	22.38	8.39
25¼	30½	19⅜	85	24	40	7¼	622,800	35,300	Industrial Rayon	No	600,000	1.68	3.01	.55
4¼	6⅛	2	5⅞	⅛	3½	¼	252,700	16,900	Intern. Agricul.	No	436,049	None	p.69	p—4.04
27½	37¼	15	23½	5	15	3¾	33,700	2,800	7% cum. pr. pfd.	100	100,000	None	p4.00	p—10.60
23	29¼	21	23¼	6¾	12½	3½	2,879,300	132,700	Intern. Nickel	No	14,584,025	.35	.53	— .14
30½	32	21	27¾	13¾	23½	9¾	45,700	2,100	Intern. Salt	No	240,000	1.50	2.04	2.14
28¼	28¼	15¾	22	7½	11	8	56,400	3,600	Kellogg (Spencer)	No	500,000	1.60	.98	—v.26
24	43⅞	24	37⅜	4¾	9⅜	3¾	780,000	32,700	Libbey Owens Ford	No	2,559,042	1.20	1.64	— .13
20½	35⅜	16⅛	50	10¼	22	9	233,700	5,400	Liquid Carbonic	No	342,406	1.00	v1.05	—u1.29
24⅛	40¾	23½	46⅜	14	20⅞	9	442,300	14,100	Mathieson Alkali	No	650,436	1.50	1.70	.86
55⅛	56½	39	83	25	30¾	13⅜	187,600	13,100	Monsanto Chem.	10	864,000	1.00	2.57	1.18
148	163	135	140	43¼	92	45	30,500	700	National Lead	100	309,831	5.00	6.98	3.15
141½	145	122	128¼	101	125	87	4,700	200	7% cum. "A" pfd.	100	243,676	7.00	18.35	13.55
111	116	100½	109⅜	75	105	61	2,150	180	6% cum. "B" pfd.	100	103,277	6.00	30.45	15.45
7	13	5½	11⅜	1⅜	3¾	1⅜	137,000	7,900	Newport Industries	1	519,347	None	.05	— .68
78½	94	60	96¾	31½	42¾	12	132,300	11,900	Owens-Illinois Glass	25	1,200,000	3.00	4.86	1.62
39⅝	41¼	33⅛	47½	19⅜	42¾	19⅞	274,600	25,500	Procter & Gamble	No	6,410,000	1.50	1.52	q1.20
114¼	117	102½	110¾	97	103½	81	5,835	240	5% pfd. (ser. 2-1-29)	100	171,569	5.00	61.95	52.16
3¾	6¾	3⅛	7¼	1⅜	4⅜	1	93,500	2,900	Tenn. Corp.	5	857,896	None	— .11	— .89
36½	43¼	30	45¼	15¼	26¾	12	633,800	66,100	Texas Gulf Sulphur	No	2,540,000	2.00	2.93	2.33
42⅛	50⅞	35⅞	51⅞	19¾	36⅜	15½	958,400	79,700	Union Carbide & Carbon	No	9,000,743	1.40	1.59	.98
42¼	46½	35	37¾	10¼	18	6⅜	225,600	8,600	United Carbon	No	370,127	2.40	1.39	— .05
37	64¾	32	94	13½	36¼	13¾	318,700	18,500	U. S. Indus. Alco.	No	391,033	None	3.56	.47
16	31¾	14	36¼	7⅜	23¾	5¼	515,900	11,300	Vanadium Corp.-Amer.	No	366,637	None	—2.40	—4.36
3⅜	5⅜	1⅞	7⅜	⅜	2⅜	½	227,900	4,300	Virginia-Caro. Chem.	No	486,000	None	p—2.46	p—5.06
18	26	10	26½	3¾	11¼	3⅛	86,000	6,500	6% cum. part. pfd.	100	213,392	None	p.52	p—5.54
79	84	59¾	63½	35⅜	69¾	20	5,060	.....	7% cum. prior pfd.	100	60,000	None	p9.06	p—12.71
20	27¼	14⅞	20½	5	12⅝	3	127,850	1,300	Westvaco Chlorine	No	284,962	.40	1.08	.79
NEW YORK CURB EXCHANGE														
15⅝	22½	14¾	16½	3¼	8½	1¾	118,500	29,600	Amer. Cyanamid "B"	No	2,404,194	m.25	.99	.14
2⅝	4⅛	2⅜	4½	1	2⅛	¾	30,100	2,500	British Celanese Am. R.C.R.	243	.....	None	...	...
91¾	104¼	81	110	27	55	8	9,925	1,550	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	32.24	.60
91	98½	83	90	51	64¼	17	3,875	400	7% cum. prior pfd.	100	113,668	7.00	47.98	7.77
10½	19	7	26⅞	2	5⅜	1⅛	19,975	575	Celluloid Corp.	15	194,952	None	—1.00	—3.79
12⅛	14⅜	10½	11⅝	4⅛	6⅞	4½	17,700	100	Courtaulds' Ltd.	1 £	24,000,000	4½%	...	...
74½	79½	67½	78	30	39	21½	58,600	6,800	Dow Chemical	No	945,000	2.00	†3.60	†1.33
6½	10¼	4	8	½	1⅜	¼	52,000	1,000	Duval Texas Sulphur	No	500,000	None	z.08	z—.17
36	37½	19	19	8	...	...	16,700	2,400	Heyden Chem. Corp.	10	147,600	1.00	2.68	1.23
45	57½	39	39⅜	13	19½	12¼	11,310	4,850	Pittsburgh Plate Glass	25	2,141,305	1.40	1.87	— .03
72½	73⅝	47¼	47	12⅞	35	17½	21,100	7,675	Sherwin Williams	25	635,583	2.00	y3.54	— .44
109½	109¾	100	99	80	100⅛	75	1,900	40	6% pfd. AA. cum.	100	155,521	6.00	y20.78	4.52
CLEVELAND STOCK EXCHANGE														
74½	79½	67½	78	30	40	21⅛	9,253	302	Dow Chemical	No	945,000	2.00	†3.60	†1.33
PHILADELPHIA STOCK EXCHANGE														
68	68	50¼	57	25¼	40	19⅞	2,775	375	Pennsylvania Salt	50	150,000	3.00	2.17	2.42

1934 Oct. Last	1934 Oct. High	1934 Oct. Low	1933 High	1933 Low	1932 High	1932 Low	Sales	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE							1934	October				
99⅜	99½	83⅞	89	64	80	54¼	3,999,000	318,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½ M. N.	29,929,000
10	17¾	5	14⅛	2⅛	18	1	2,966,000	248,000	Anglo Chilean s. f. deb. 7's	1945	7 M. N.	12,700,000
68½	88	61½	74⅞	37	60	34½	401,400	24,000	By-Products Coke Corp. 1st 5½'s "A"	1945	5½ M. N.	4,932,000
86⅜	87	62	65	38½	54⅞	32	272,000	60,000	Int. Agric. Corp. 1st. Coll. tr. stpd. to 1942	1942	5 M. N.	5,994,100
11	19½	5⅛	14⅞	2½	15¼	¼	11,710,000	895,000	Lautaro Nitrate conv. b's	1954	6 J. J.	31,357,000
95¼	98½	90	99⅛	87	97¾	67	568,000	26,000	Montecatini Min & Agric. det. 7's with war.	1937	7 J. J.	7,075,045
44	74½	44	62	33¾	59	17	414,000	.....	Ruhr Chem. 6's	1948	6 A. O.	3,156,000
84¼	88¼	65½	76	50	66	39	208,000	5,000	Tenn. Corp. deb. 6's "B"	1944	6 M. S.	3,007,900
83	89½	62	81	34¾	75	30	472,000	38,000	Vanadium Corp. conv. 5's	1941	5 A. O.	4,261,000
NEW YORK CURB EXCHANGE												
102½	104¼	101⅜	103½	101	103⅛	99	89,000	3,000	Westvaco Chlorine Prod. 5½'s	1937	5½ M. S.	1,393,000

* Plus 1.50 extra; † Years ended 5-31-33-& 34; h Plus 25c ended 5-31-32-& 33; j Plus 75c ended 5-31-32-& 33; k Plus 75c ended 5-31-32-& 33; m Last paid, no regular rate; p Years ended 6-30-33 and 6-30-34; r Year ended 11-30-32; s Years ended 10-31-32 & 33; u Year ended 9-30-32; v Years ended 9-2-32 & 33; x Years ended 5-31-32 & 33; y Year ended 8-31-33; z Years ended 8-31-33, and 8-31-34.

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The Trend of Prices

Retail Trade Gains

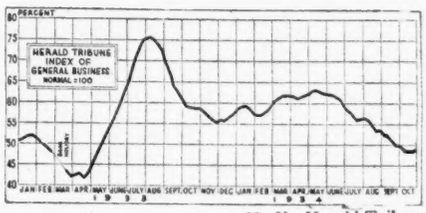
Business continues to present strange contrasts; somewhat bewildering are the conflicting reports. "Next door to the impossible" is the task of attempting to fit the various parts into an intelligible picture. Any summary must of necessity be disjointed and full of "ifs" and "buts."

Favored by seasonal weather during part of the month, retail trade is reported from 8 to 15% ahead of the same month last year, thus continuing a trend that has been going in the upward direction for 3 months. In many sections of the country October retail trade made the best showing of any month since last Spring. The South is the best spot on the retail map at the moment.

Wholesale trade is spotty, but generally better. Christmas business is expected to be about 10 to 15% ahead of last year. With retail trade holding at satisfactory levels, wholesalers feel that substantial reordering is imminent.

In the so-called heavy industries is where the drag is most noticeable. Steel activity shows a gain, but the industry is only operating at 25% capacity. After a very satisfactory year, automotive production schedules at Detroit are sharply curtailed and a seasonal pick-up cannot be hoped for until December.

Trend of Business Activity



N. Y. Herald-Tribune

Uncertainties

Business is undoubtedly uneasy over many important questions, although the President's speech before the American Bankers' Association and his recent plea for an industrial truce between labor and capital have helped to dissipate, at least in part, some of this feeling of uncertainty. Dun & Bradstreet's end of the month report on business summarizes this situation as follows: "Business progress is still being restricted by the general hesitant attitude, prompted by a number of extraneous influences. Increased evidence is appearing, however, that the sagging business level has been checked and preparations completed for a forward movement."

Electrical Consumption Up

Each week in October electrical consumption showed a gain over the corresponding period of '33, but carloadings ran from 2 to 5% below last year's totals. In the manufacturing lines, cotton production rebounded from the extremely low level reached in the strike period in September; tanning operations are below satisfactory levels; glass production is reported as being only fair, paint manufacturing is seasonably dull, but with bright prospects, due to the success of the national drive for remodeling and renovation. The *N. Y. Times* index of business activity reports an advance.

Bright Spots

As October gives way to November improvement in sentiment is reported in many directions. Higher rate of activity is expected in the steel centers; Henry Ford announces "that the depression is over for his company" and issues an order for construction of a million Fords in '35 (1934 Ford production is reported to have been around 775,000); unit sales by Chrysler for the last 9 months of '34 were greatest in the history of the company, although net profits were less; Akron rubber center is cheered by Mr. Ford's statement and an advance in tire prices after months of hesitancy; reports from various parts of the country indicate an increase in interest by the public in the Government's renovation program.

Commodity Prices Lower

Commodity prices generally show losses for the October period, most of the leading indices being off when compared with the end of September. Cottonseed oil and lard continue to supply plenty of fireworks.

October chemical tonnages were better than in the previous month. Alkali prices are holding up well and '35 contracts are being written up at a fairly rapid rate. Prices, generally, are firm; glycerine stocks are at a very low point. The outstanding weakness is in acetate of lime.

Monthly Statistics of Business

	Sept. 1934	Sept. 1933	August 1934	August 1933	July 1934	July 1933
Auto production	168,872	191,800	234,809	232,855	266,575	229,357
Bldg. contracts *‡	$110,219	$120,134	$120,269	$105,989	$119,698	$82,554
Failures, Dun & Bradstreet	790	1,116	929	1,472	912	1,421
Merchandise imports ‡	$131,659	$146,643	$119,515	$154,918	$127,342	$142,980
Merchandise exports ‡	$191,690	$160,119	$171,965	$131,473	$166,787	$144,109
Newsprint production						
Canada, tons	196,172	179,416	216,164	194,262	208,238	180,387
U. S., tons	74,117	72,907	80,903	84,521	76,184	79,482
Newfoundland, tons	25,847	23,701	30,223	24,826	27,298	21,178
Total, tons	297,886	277,033	329,158	305,242	313,767	282,336
Newsprint shipments						
Canada, tons	195,320	183,971	209,938	194,354	109,926	181,658
U. S., tons	70,941	75,008	90,482	82,503	70,133	82,068
Total (U. S. & Can.)	266,261	258,979	300,420	276,857	270,059	263,726
Plate glass prod., sq. ft.	.....	.....	7,449,906	11,326,618	7,241,887	.....
Shoe production, pairs	.....	.....	35,023,449	37,019,170	28,246,982	33,749,134
Steel ingots, tons	1,251,630	2,283,079	1,355,045	2,801,033	1,472,584	3,168,354
Steel activity, % of capacity	22.74	40.40	22.93	48.79	26.75	58.30
U. S. consumption crude rubber, tons	30,352	35,281	33,310	44,428	32,647	49,614
Tire shipments	.....	.....	4,308,270	4,707,085	4,157,411	5,497,191
Tire production	.....	.....	3,532,631	4,993,609	3,352,836	5,713,626
Tire inventory	.....	.....	8,697,151	7,069,574	9,436,816	6,844,001
Factory payroll totals †	57.9	59.1	62.2	56.8	60.4	50.8
Factory employment †	75.8	80.0	79.4	63.4	78.6	71.5
Dept. of Labor, Chem. price index †	80.3	78.8	.....	.....	78.5	80.3
Dept. of Labor, Chem. employment †	.....	.....	110.9	96.8	112.3	87.9
Dept. of Labor, Chem. payrolls †	.....	.....	96.5	81.0	96.6	74.4
Chemicals & Related Products						
Imports ‡	$4,184	.....	$3,917	.....	.....	.....
Exports ‡	$7,737	.....	$7,722	.....	$7,297	.....
Stocks, mfd. goods †	.....	120	121	112	117	.....
Stocks, raw materials †	.....	104	88	88	85	.....

* 37 states, F. W. Dodge Corp.; ‡ 000 omitted; † Dept. of Labor, 3-year average, 1923-1925 = 100.0.

Weekly Business Statistics

Week Ending	Carloadings 1934	Carloadings 1933	Carloadings % Inc.	Electrical Output* 1934*	Electrical Output* 1933*	Electrical Output* % Inc.	Jour. of Com. Price Index	National Fertilizer Association Indices: Metals	Fats & Oils	Chem. & Drugs	Mixed Fert.	Fert. Mat.	All Groups	Labor Dept. Chem. & Drug Price Index	% Steel Activity	Fisher's Index Purch. Power	N. Y. Times Index Bus. Act.
Sept. 29	644,647	669,186	—3.7	1,648,976	1,652,811	—0.2	77.3	81.6	60.1	93.4	76.4	65.0	76.4	77.0	23.2	124.8	73.7
Oct. 6	631,318	662,373	—4.6	1,659,192	1,646,136	+0.8	76.3	81.5	58.9	93.7	76.4	65.4	75.3	77.3	24.5	125.5	74.7
Oct. 13	635,639	670,680	—5.2	1,656,864	1,618,948	+2.3	76.8	81.5	59.1	93.7	74.4	65.1	75.1	77.1	24.0	126.4	75.0
Oct. 20	640,280	657,005	—2.5	1,667,505	1,618,795	+3.0	76.7	81.6	61.1	93.7	74.6	65.2	74.8	77.2	23.9	126.5	76.0
Oct. 27	624,252	642,423	—2.8	1,677,299	1,621,702	+3.4	75.6	81.7	62.8	93.7	74.6	65.2	74.3	77.2	25.0	126.9	75.2

* Kw. 000 omitted.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1933 Average $1.56. - Jan. 1934 $1.37 - Oct. 1934 $1.26

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Acetaldehyde, drs 1c-1 wks.lb.	...	.16	.16	.21	.18½ .21
drums, c-l, wks.....lb.	...	.14	.14	.16½	... ...
Acetaldol, 95%, 50 gal dr. wks	.21	.25	.21	.31	.27 .31
Acetamide .....lb.	.38	.43	.40	1.35	.95 1.35
Acetanilid, tech, 150 lb bbl.lb.	...	.26	...	.26	... .26
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25	.21	.25	.21 .25
Acetin, tech drums.....lb.	.30	.32	.30	.32	.30 .32
Acetone, tanks .....lb.	.11	.12	.10	.12	.08 .10
Acetone Oil, bbls NY....gal.	1.15	.25	1.15	.25	1.15 1.25
Acetyl Chloride, 100 lb cby.lb.	.55	.68	.55	.68	.55 .68
Acetylene Tetrachloride (see tetrachlorethane)					
Acids					
Acid Abietic	.06¾	.07	.06	.07	.06 .12
Acetic, 28% 400 lb. bbls c-l wks .....100 lb.	...	2.53	2.53	2.91	2.65 2.91
Glacial, bbl c-l wk..100 lb.	...	8.69	8.69	10.02	9.14 10.02
Adipic	.72	.72	.72	.72	.72 .72
Anthranilic, refd, bbls.....lb.	.85	.95	.85	.95	.85 .95
Technical, bbls.....lb.	.65	.70	.65	.70	.65 .70
Battery, cbys .....100 lb.	1.60	2.25	1.60	2.25	1.60 2.25
Benzoic, tech, 100 lb bbls.lb.	.40	.45	.40	.45	.35 .45
Boric, powd, 250 lb bbls...lb.	.0425	.05	.0425	.05	.0425 .05
Broenner's, bbls.....lb.	1.20	1.25	1.20	1.25	1.20 1.25
Butyric, 100½ basis cbys.lb.	.80	.85	.80	.85	.80 .85
Camphoric .....lb.	...	5.25	...	5.25	... 5.25
Chlorosulfonic, 1500 lb drums wks. .....lb.	.04½	.05½	.04½	.05½	.04½ .05½
Chromic, 99¾%, drs....lb.	.13½	.15½	.13½	.15½	.11½ .14¼
Chromotropic, 300 lb bbls.lb.	1.00	1.06	1.00	1.06	1.00 1.06
Citric, USP, crystals, 230 lb. bbls. .....lb.	.28	.29	.28	.30	.29 .30
Cleve's, 250 lb bbls.....lb.	.54	.54	.52	.54	.52 .54
Cresylic, 95%, dark drs N Y .....gal.	.54	.56	.50	.56	.38 .50
97-99%, pale drs NY..gal.	.59	.61	.55	.60	.40 .55
Formic, tech 90%, 140 lb. cby .....lb.	.11	.13	.11	.13	.10½ .13
Furoic, tech, 100 lb drums.lb.	...	.35	...	.35	... .35
Gallic, tech, bbls.....lb.	.60	.70	.60	.70	.60 .70
USP, bbls.....lb.	...	.77	.74	.77	... .74
Gamma, 225 lb bbls wks..lb.	.77	.79	.77	.79	.75 .79
H, 225 lb bbls wks.....lb.	.65	.70	.65	.70	.60 .70
Hydriodic, USP, 10% soln cby .....lb.	.50	.51	.50	.51	.50 .51
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48	.45	.48	.45 .48
Hydrochloric, CP, see Acid Muriatic					
Hydrocyanic, cyl. wks....lb.	.80	.90	.80	.90	.80 .90
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	...	.07	...	.07	.06 .07
Hydroflucsilicic, 35%, 400 lb. bbls wks.....lb.	.11	.12	.11	.12	.11 .12
Hypophosphorous, 30%, USP, demijohns .....lb.	.75	.80	.75	.80	.75 .80
Lactic, 22%, dark, 500 lb. bbls. .....lb.	.04	.04½	.04	.04½	.04 .04½
44%, light, 500 lb bbls..lb.	.11½	.12	.11½	.12	.11½ .12
Laurent's, 250 lb bbls.....lb.	.36	.37	.36	.37	.36 .37
Linoleic .....lb.	.16	.16	.16	.16	.16 .16
Maleic, powd. kegs.....lb.	.29	.32	.25	.32	... ...
Malic, powd. kegs.....lb.	.45	.60	.45	.60	.45 .60
Metanilic, 250 lb bbls....lb.	.60	.65	.60	.65	.60 .65
Mixed Sulfuric—Nitric..... tanks wks.....N unit	.06½	.07¼	.06½	.07¼	.06½ .07¼
tanks wks.....S unit	.008	.01	.008	.01	.008 .01
Monochloroacetic, tech bbl.lb.	.16	.18	.16	.18	.16 .18
Monosulfonic, bbls.....lb.	1.50	1.60	1.50	1.60	1.50 1.60
Muriatic, 18 deg, 120 lb cbys c-l wks.....100 lb.	...	1.35	...	1.35	... 1.35
tanks, wks.....100 lb.	...	1.00	...	1.00	... 1.00
20 degrees, cbys wks.100 lb.	...	1.45	...	1.45	... 1.45
N & W.....250 lb bbls.	.85	.95	.85	.95	.85 .95
Naphthenic, drums .....lb.	.12	.13	.10	.13	.10 .11½
Naphthionic, tech.....250 lb.	.60	.65	.60	.65	.60 .65
Nitric, 36 deg, 135 lb cbys c-wks .....100 lb.	...	5.00	...	5.00	... 5.00
40 deg, 135 lb cbys, c-l wks. .....100 lb.	...	6.00	...	6.00	... 6.00
Oxalic, 300lb bbls wks NY.lb.	.11⅞	.12⅜	.11⅞	.12⅜	.11 .12⅜
Phosphoric 50%, USP....lb.	...	.14	...	.14	... .14
50%, acid, c.l. drums..lb.	.05	.05	.05	.05	.05 .05
75%, acid, c.l. drums..lb.	.07	.07	.07	.07	.07 .07
Picramic, 300 lb bbls.....lb.	.65	.70	.65	.70	.65 .70
Pyrogallic, crystals .....lb.	1.60	1.65	1.40	1.65	1.40 1.45
Salicylic, tech, 125 lb bbl..lb.	.33	.37	.33	.37	.33 .37
Sebacic, tech, drum.....lb.	.58	.58	.58	.58	.58 .58
Sulfanilic, 250 lb. bbls....lb.	.18	.19	.18	.19	.15 .17
Sulfuric, 66 deg, 180 lb. cbys 1c-1 wks.....100 lb.	1.60	1.95	1.60	1.95	1.60 1.95

†Anhydrous 5c higher *Delivered metropolitan area, basic price 33c. ‡Higher price is refrigeration grade. the cost of tax paid ethyl alcohol. Quotation above includes this tax. Grain alcohol is 20c a gal. higher.

* Delivered Metropolitan area.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Picric, kegs.....lb.	.30	.50	.30	.50	.30 .50
tanks, wks.....ton	...	15.00	...	15.00	... 15.00
1500 lb dr wks....100 lb.	1.50	1.65	1.50	1.65	1.50 1.65
60°, 1500 lb dr wks..100 lb.	1.27½	1.42½	1.27½	1.42½	127½ 1.42½
Oleum, 20%, 1500 lb. drs 1c-1 wks.....ton	...	18.50	...	18.50	... 18.50
40%, 1c-1 wks net.....ton	...	42.00	...	42.00	... 42.00
Tannic, tech, 300 lb bbls.lb.	.23	.40	.23	.40	.23 .40
Tartaric, USP, gran. powd, 300 lb bbls.....lb.	...	.25	.25	.26	.20 .25
Tobias, 250 lb bbls.....lb.	.75	.80	.75	.80	.75 .80
Trichloroacetic bottles..lb.	2.00	2.75	2.00	2.75	2.00 2.75
Kegs .....lb.	...	1.75	...	1.75	... 1.75
Tungstic, bbls.....lb.	1.35	1.45	1.35	1.70	1.40 1.70
Albumen, blood,225 lb bbls.lb.	.45	.53	.35	.53	.35 .43
dark .....bbls., lb.	.12	.17	.10	.17	.10 .17
Egg, edible .....lb.	.85	.87	.82	.92	.74 .90
Technical, 200 lb cases.lb.	.62	.66	.62	.66	.62 .66
Vegetable, edible.....lb.	.65	.70	.65	.70	.60 .70
Technical .....lb.	.50	.55	.50	.55	.50 .55
Alcohol Amyl (from pentane) Tanks, del.....lb.	...	.143	...	.143	.143 .176
Drums, del.....lb.	.15	.157	.15	.157	... ...
Tertiary, drums, del.... lb.	.062	.070	.062	.093	... ...
Tanks, del.....lb.	...	.052	...	.052	... ...
Alcohol Butyl, Normal, 50 gal drs c-l wks.....lb.	...	.13	.10½	.13	... .10½
Drums, l-c-l wks.....lb.	...	.13½	.11	.13½	... .11
Tank cars, wks.....lb.	...	.12	.09½	.12	... .09½
Secondary tank . .....lb.	...	.096	.076	.096	... ...
drums carlots .....lb.	...	.086	...	.086	... ...
Capryl, tech, drums....lb.	...	.85	...	.85	... .85
Diacetone, tanks .....lb.	.16	.17	.15¾	.17	.15¼ .16¾
Ethyl, USP, 190 pf, 50 gal. bbls .....gal.	...	4.15½	4.12½	4.24½	2.44½ 2.65
No. 5. *188 pf, 50 gal. drs., drums extra..gal.	.34*	.421*	.30*	.421*	... ...
No. S. D. 1, tanks...gal.	...	.295	.29½	.304	... .304
Furfuryl, tech., 500 lb. drs. .....lb.	...	.35	.35	.40	.40 .45
Isobutyl, ref., gal. drs..gal.	...	.60	.60	.75	... .75
Isopropyl, ref, gal drs..gal.	...	.45	.45	.50	.45 .50
Propyl Normal, 50 gal dr. .....gal.	...	.75	...	.75	... .75
Aldehyde Ammonia, 100 gal. dr. .....lb.	.80	.82	.80	.82	.80 .82
Alpha-Naphthol, crude, 300 lb. bbls. .....lb.	.65	.70	.65	.70	.65 .70
Alpha-Naphthylamine, 350 lb. bbls. .....lb.	.32	.34	.32	.34	.32 .34
Alum Ammonia, lump, 400 lb. bbls, l-c-l wks..100 lb.	2.90	3.25	3.00	3.25	3.00 3.25
Chrome, 500 lb casks, wks .....100 lb.	7.00	7.25	6.50	7.25	4.50 6.50
Potash, lump, 400 lb casks wks .....100 lb.	2.90	3.25	3.00	3.50	3.00 3.50
Soda, ground, 400 lb bbls wks .....100 lb.	3.50	3.75	350	3.75	3.50 3.75
Aluminum Metal, c-l NY .....100 lb.	20.00	23.30	20.00	24.30	22.00 24.30
Chloride Anhyd., 99%, wks .....lb.	.07	.12	.07	.12	... ...
93% grade, wks.....lb.	.04	.08	.04	.08	... ...
Hydrate, 96%, light, 90 lb. bbls. .....lb.	.13	.15	.13	.16½	.15 .16½
Oleate, drums.....lb.	...	.15¾	...	...	... ...
Palmitate, bbls. .....lb.	.20	.21	.19	.21	... ...
Resinate, pp., bbls. ....lb.	....	.15	.12½	.15	... ...
Stearate, 100 lb bbls.....lb.	.17	.19	.17	.18	.12½ .18
Sulfate, Iron, free, bags c-l wks .....100 lb.	1.90	1.95	1.90	1.95	1.90 1.95
Coml, bags c-l wks 100 lb.	1.35	1.50	1.35	1.50	1.25 1.50
Aminoazobenzene, 110 lb kegs .....lb.	...	1.15	...	1.15	... 1.15
Ammonia					
Ammonia anhydrous Com. tks.	.04½	.05½‡	.04½	.05½‡	.04½ .05½
Ammonia anhyd, 100 lb cyl lb.	.15¼	.15½	.15¼	.15½	.15¼ .15½
Water, 26°, 800 lb dr del.lb.	.02½	.03	.02½	.03	.02½ .03
Ammonia, aqua 26° tanks.. NH cont.....	...	.05	...	.05	... .05
Ammonium Acetate.....lb.	.26	.33	.26	.33	.26 .33
Bicarbonate, bbls., f.o.b. plant .....100 lb.	...	5.15	...	5.15	... 5.15
Bifluoride, 300 lb bbls..lb.	.15¼	.17	.15¼	.17	.15¼ .17
Ammonium carbonate, tech, 500 lb cs.....lb.	.08	.12	.08	.12	.08 .12
Chloride, White, 100 lb. bbls, wks .....100 lb.	5.00	5.25	5.00	5.25	4.45 5.25
Gray, 250 lb bbls wks.lb.	5.25	5.75	5.25	5.75	5.25 5.75
Lump, 500 lbs cks spot.lb.	.10	.11	.10	.11	.10 .11
Lactate, 500 lb bbls.....lb.	.15	.16	.15	.16	.15 .16
Linoleate .....lb.	...	.12	.11	.12	... .11
Nitrate, tech, casks.....lb.	.03¾	.05	.03¾	.05	.03¾ .10
Oleate, drs.....lb.	...	.10	...	.10	... .10
Persulfate, 112 lb kegs..lb.	.22½	.25	.20	.25	.20 .22½
Phosphate, tech, powd, 325 lb. bbls .....lb.	.08	.10	.08	.11½	.08½ .11½

Prices Current

		Current Market	1934 Low	1934 High	1933 Low	1933 High
Ammonium sulfate, bulk c-l	100 lb.	...	1.20	1.10	1.25	1.00	1.25
Sulfocyanide, kegs	lb.	...	.50	...	.50	.36	.50
Amyl Acetate, (from pentane) Tanks del	lb.	...	.13½	...	.13½	...	.13½
Tech., drs., del	lb.	.142	.149	.142	.149	.138	.149
Secondary, tanks	lb.	...	.108	.09	.108	...	.09
Amyl Alcohol, see also Fusel Oil							
Amyl Alcohol, sec	lb.	...	.08½	.08½	.08½	...	...
Chloride, normal, drums, wks.	lb.	.56	.68	.56	.68	...	...
Chloride, mixed, drums, wks.	lb.	.07	.077	.07	12.2	...	...
tank wks.	lb.	...	.06	.06	10.5	...	...
Lactate, wks, drums	lb.	...	.50	...	.50	...	...
Mercaptan, wks, drums	lb.	...	1.10	...	1.10	...	...
Stearate, wks, drums	lb.	...	.31	...	.31	...	...
Amylene, drums, wks.	lb.	.102	.11	.10	.11	...	...
tanks, wks.	lb.	...	.09	...	.09	...	...
Aniline Oil, 960 lb drs & tks	lb.	.15	.17½	.15	.17½	.14½	.16
Annatto fine	lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80%	lb.	...	.75	...	.75	...	...
40%	lb.	...	.18	...	.18	...	...
Anthraquinone, sublimed, 125 lb. bbls.	lb.	.45	.50	.45	.50	...	.45
Antimony, metal slabs, ton lots	lb.	...	.09½	.07	.09½	.05⅝	.07½
Needle, powd., bbls	lb.	.07	.08	.07	.09	.07	.09
Chloride, soln (butter of) cbys	lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls.	lb.	.08¼	.09½	.08	.11	.07½	.11
Salt, 63% to 65%, tins	lb.	.22	.24	.22	.24	.20	.24
Sulfuret, golden, bbls	lb.	.16	.20	.16	.20	.16	.20
Vermilion, bbls.	lb.	.35	.42	.35	.42	.38	.42
Archil, conc., 600 lb bbls.	lb.	.21	.27	.21	.27	.20	.21
Double, 600 lb bbls	lb.	.18	.20	.18	.20	.16	.17
Triple, 600 lb bbls	lb.	.18	.20	.18	.20	.16	.17
Argols, 80%, casks	lb.	.15	.16	.15	.16	.12	.15
Crude, 30%, casks	lb.	.07	.08	.07	.09	.06¾	.09
Aroclors, wks.	lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl.	lb.	.08¾	.09¾	.08¾	.09¼	...	...
Arsenic, Red, 224 lb cs. kegs	lb.	...	.15¾	.14	.15¾	.09⅜	.14¾
White, 112 lb kegs	lb.	.03½	.04½	.03½	.05	.04	.05
Metal	lb.	.40	.42	.40	.45	...	...
Asbestine, c-l wks	ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium Carbonate, precip, 200 lb. bags wks‡	ton	56.50	61.00	56.50	61.00	56.50	61.00
Nat. (witherite) 90% gr. car-lots wks bags	ton	...	45.00	...	45.00	...	...
Chlorate, 112 lb kegs NY	lb.	.14½	.16	.14	.16	.13¾	.16
Chloride, 600 lb bbl wks.	ton	72.00	74.00	72.00	74.00	61.50	74.00
Dioxide, 88%, 690 lb drs.	lb.	.11	.13	.11	.13	.11	.13
Hydrate, 500 lb bbls	lb.	.05	.06	.04¾	.06	.04¼	.05
Nitrate, 700 lb casks	lb.	...	.08¼	...	.08¼	...	.07¼
Barytes, Floated, 350 lb bbls wks	ton	23.00	30.50	23.00	30.50	22.20	30.50
Bauxite, bulk, mines	ton	7.00	10.00	5.00	10.00	5.00	6.00
Bayberry Wax, bags	lb.	.25	.28	.25	.30	.14½	.17
Beeswax, Yel., crude bags.	lb.	.21½	.22	.16	.22	.13	.20
Refined, cases	lb.	.26	.29	.21	.29	.18	.26
White, cases	lb.	.34	.37	.32	.37	.30	.35
Benzaldehyde, technical, 945 lb. drums wks.	lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks.	gal.	...	.19	.19	.20½	.20	.22
Ind. Pure, tanks wks.	gal.	...	.19	.19	.20½	.20	.22
Benzidine Base, dry, 250 lb. bbls.	lb.	.67	.69	.67	.69	.65	.67
Benzoyl, Chloride, 500 lb drs.	lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech drs.	lb.	...	.30	...	.30	...	.30
Beta-Naphthol, 250 lb bbl wk	lb.	...	.24	...	.24	...	.24
Naphthylamine, sublimed, 200 lb bbls	lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls	lb.	.53	.58	.53	.58	.53	.58
Bismuth metal,		1.10	1.20	1.10	1.30	.85	1.30
Bismuth, Subnitrate		1.55	1.60	1.40	1.60	.95	1.40
Blackstrap, cane, (see Molasses, Blackstrap)							
Blanc Fixe, 400 lb bbls wks	ton	42.50‡	70.00	42.50‡	70.00	42.50	75.00
Bleaching Powder, 800 lb drs c-l wks contract	100 lb.	...	1.90	...	1.90	1.75	1.90
Blood, dried, fob, NY	unit	...	2.65	2.40	3.25	1.55	2.75
Chicago, high grade	unit	...	2.90	2.00	3.10		
S. American shipt.	unit	...	3.00	2.75	3.20	1.90	3.00
Blues, Bronze Chinese Milori Prussian Soluble	lb.	.35½	.37½	.35½	.37½	...	.35
Bone, raw, Chicago	ton	21.00	22.00	20.00	25.00	19.00	28.00
Bone Ash, 100 lb kegs	lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb. bbls.	lb.	.05½	.08¼	.05½	.08¼	.05½	.08
Meal, 3% & 50%, Imp.	ton	...	23.50	16.00	24.00	18.00	27.50
Borax, bags	lb.	.018	.02	.018	.02	.018	.02
Bordeaux, Mix. 16% pwd.	lb.	.08	.16½	.08	.16½	.11½	.13
Brazilwood, sticks, shpmt.	lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases	lb.	.36	.43	.36	.43	.36	.43
Bronze, Alumi., pwd blk.	lb.	.50	.75	.50	.75	.50	.75
Gold bulk	lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16.32° group 3 tanks	lb.	.02¾	.04	.02¾	.04	.02¾	.04
Butyl, Acetate, normal drs.	lb.	.13	.14	.11	.14	.11	.139
Tank, wks.	lb.	.12	.13	.10	.13	.10	.124
Secondary tanks, wks.	lb.	...	.08	...	.08	...	...
Aldehyde, 50 gal drs wks	lbs.	.18	.19	.19	.36	.31½	.36
Carbitol see Diethylene Glycol Mono (Butyl Ether).		...	...	...	...	...	...

‡Lowest price is for pulp; highest for high-grade precipitate.

Ammonium Sulfate
Butyl Carbitol

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Technical 82-84% and 90-92%
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Special Fractions
CRESYLIC ACID
99% Straw Color and 95% Dark
XYLENOLS
TAR ACID OILS
NAPHTHALENE
Crude, Refined Chipped,
Flake and Ball
RUBBER SOFTENERS
CUMAR*
Paracoumarone-indene Resin
BARRETAN*
PICKLING INHIBITORS
PYRIDINE
Refined, Denaturing and
Commercial
PICOLINES
QUINOLINES
FLOTATION OILS and
REAGENTS
HYDROCARBON OIL
SHINGLE STAIN OIL
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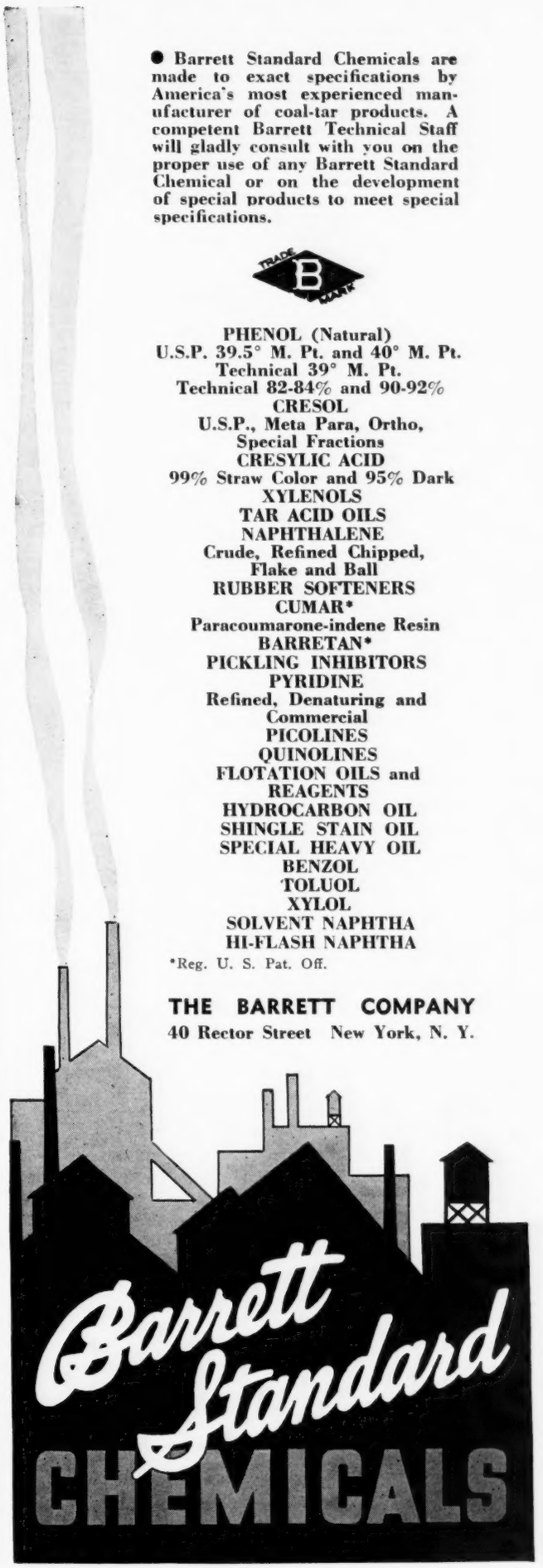

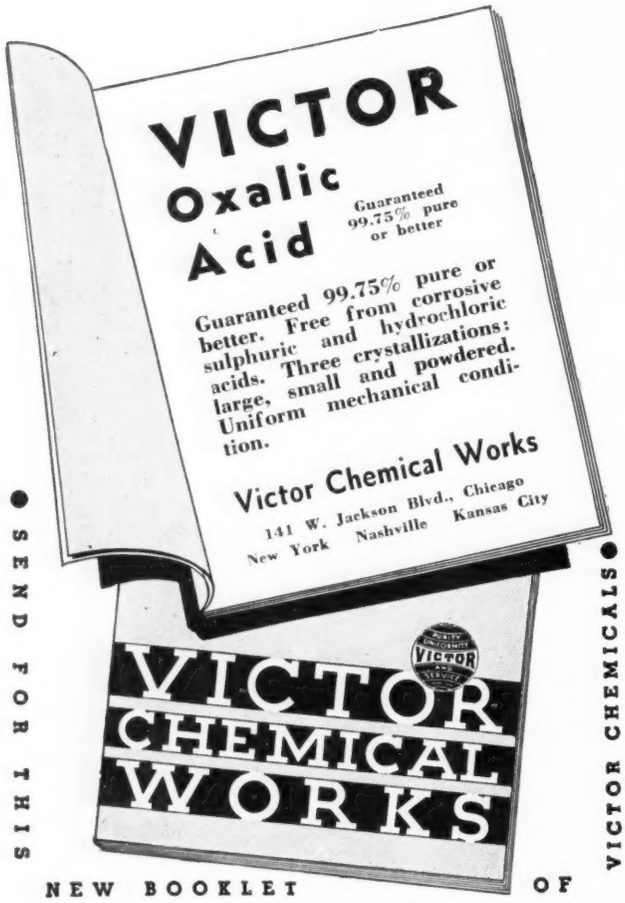
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Empire State Bldg. **New York City**

Butyl Carbinol
Cobalt Resinate

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Butyl carbinol, sec., drums..lb.	.60	.75	.60	.75	...	...
Carbinol, normal, drms, wks, ...lb.	.60	.75	.60	.75	...	...
Cellosolve (see Ethylene glycol mono butyl ether)						
Furoate, tech, 50 gal dr..lb.	...	.65	.60	.65	.50	.60
Lactate drums .....lb.	...	.23½	.23½	.29	...	...
Propionate, drs.....lb.	.17	.18	.17	.22	.20	.22
Stearate, 50 gal drs.....lb.	...	.26	.25	.26	.25	.25
Tartrate, drs.....lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes..lb.	.70	.75	.65	.75	.65	.75
Calcium, Acetate, 150 lb bags c-l .....100 lb.	...	2.25	2.25	3.00	2.50	3.00
Arsenate, 100 lb bbls c-l wks .....lb.	...	.06	.05	.07	.05½	.07
Carbide, drs.....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-l.....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-l wks.....ton	...	19.50	...	19.50	19.50	21.00
Solid, 650 lb drs c-l fob wks .....ton	...	17.50	...	17.50	17.50	18.00
Ferrocyanide, 350 lb. f.o.b. wks. .....lb.	...	.17	...	.17	.17	.17
Furoate, tech, 100 lb.dr..lb.	...	.25	.25	.30	...	.30
Gluconate, tech, 125 lb. bbls. .....lb.	...	.28	.25	.28	...	...
Nitrate, 100 lb bags....ton	...	26.50	...	26.50	24.00	26.50
Palmitate, bbls. .....lb.	.20	.21	.19	.20	.16	.19
Perioxide, 100 lb drs....lb.	...	1.25	...	1.25	...	1.25
Phosphate, tech, 450 lb bbls. .....lb.	.07½	.08	.07½	.08	.07½	.08
Resinate, precip., bbls...lb.	.13	.14	.13	.14	...	...
Stearate, 100 lb. bbls....lb.	.17	.19	.17	.19	.12½	.18
Camphor, slabs .....lb.	.52	.53	.51	.59	.35½	.59
Powder .....lb.	.52	.53	.51	.59	.38	.59
Camwood, Bk, ground bbls..lb.	.16	.18	.16	.18	.16	.18
Candelilla Wax, bags.....lb.	...	.11¾	.10¼	.14½	.09	.11
Carbitol, (See Diethylene Glycol Mono Ethyl Ether)..	...	...	...	...	...	...
Carbon, Decolorizing, drums c-l .....lb.	.08	.15	.08	.15	.08	.15
Black, 100-300 lb cases1c-1 NY .....lb.	.07	.08¼	.06½	.08¼	.06	.12
Bisulfide, 500 lb drs 1c-1 NY .....lb.	.05½	.06	.05½	.06	.05½	.06
Dioxide, Liq. 20-25 lb. cyl. .....lb.	...	.06	...	.06	...	.06
Tetrachloride, 1400 lb drs delivered .....lb.	.05¼	.06	.05¼	.06	.05¼	.07
Carnauba Wax						
No. 1 Yellow, bags....lb.	...	.39½	.30	.39½	.20	.35
No. 2 N Country, bags.lb.	.24	.25	.20	.28	.14	.20
No. 3 N. C.....lb.	.23	.24	.16¼	.24¾	.11½	.17
Casein, Standard, Domestic ground .....lb.	.09½	.10	.09½	.13	.06½	.15
80-100 mesh c-l, bags...lb.	.10½	.12	.10½	.14	...	...
Cellosolve (see Ethylene glycol mono ethyl ether)....						
Acetate (see Ethylene glycol mono ethyl ether acetate)						
Celluloid, Scraps, Ivory cs..lb.	...	.18	.13	.18	.13	.15
Transparent, cases .....lb.	...	.20	.16	.20	...	.16
Cellulose, Acetate, 50 lb kegs .....lb.	.55	.60	.55	.90	.80	.90
Chalk, dropped, 175 lb bbls.lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks.lb.	.03	.04	.03	.04	.02	.03½
Light, 250 lb casks.....lb.	.03	.04	.03	.04	.02½	.03½
Charcoal, Hardwood, lump, bulk wks .....bu.	...	.20	.18	.20	.18	.19
Willow, powd, 100 lb bbl. wks .....lb.	.06	.06¼	.06	.06¼	.06	.06¼
Wood, powd, 100 lb. bbls.lb.	.04	.05	.04	.05	.04	.05
Chestnut, clarified bbls wks.lb.	.01⅝	.01¾	.01⅝	.01¾	.01¼	.02
25% tks wks.....lb.	...	.01½	.01¼	.01½	.012	.01½
Pwd, 60%, 100 lb. bags wks. .....lb.	...	.04⅞	...	.04⅞	...	.04¾
Powd, decol. bgs wks...lb.	.05	.05¼	.05	.05¼	.04⅞	.05
China Clay, cl. blk mines.ton	...	9.00	8.00	9.00	8.00	9.00
Powdered, bbls.....lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks...ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, bulk..ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls 1c-1 wks contract .....lb.	.07	.08½	.07	.08½	.07	.08½
cyls, cl., contract.....lb.	...	.05½†	...	.05½†	...	.05½
Liq tank cyls wks contract .....100 lb.	...	2.00	1.85	2.00	1.75	1.85
Multi c-l cyls. wks cont..lb.	2.00	2.25	2.00	2.25	...	...
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks.....lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs .....lb.	.20	.21	.20	.21	.15	.20
USP, tins.....lb.	.30	.31	.30	.35	...	...
Chloropicrin; comml cyls.lb.	.85	.90	.85	1.25	.90	1.35
Chrome, Green, CP.....lb.	.20	.30	.20	.30	.28	.29
Commercial .....lb.	.06¼	.10	.06¼	.10	.06¼	.10
Yellow .....lb.	.15	.16	.15	.16	.14	.16
Chromium, Acetate, 8% Chrome bbls .....lb.	.05	.05¾	.05	.05¾	.04¾	.05¾
20° soln, 400 lb. bbls..lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb. bbl. .....lb.	.27	.28	.27	28	.27	.28
Oxide, green, bbls.....lb.	.22	.23	.22	.23	.19	.23
Coal tar, bbls.....bbl.	8.50	9.00	8.50	9.00	8.50	9.00
Cobalt Acetate, bbls.....lb.	...	.60	.60	.80	...	...
Carbonate tech., bbls...lb.	1.35	1.40	1.34	1.40	...	...
Hydrate, bbls .....lb.	1.66	1.76	1.66	1.76	...	...
Linoleate, paste, bbls....lb.	...	.30	.30	.40	...	...
Resinate, fused, bbls....lb.	...	.12½	...	.12½	...	...
Precipitated, bbls .....lb.	...	.32	.32	.42	.41	.42

† Delivered.

Current — Cobalt Oxide Ether

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Cobalt Oxide, black, bags..lb.	1.25	1.35	1.25	1.35	1.15	1.35
Cochineal, gray or bk. bg..lb.	.35	.40	.35	.42	.36	.42
Teneriffe silver, bags...lb.	.36	.40	.36	.43	.37	.43
Copper, metal, electrol 100 lb.	...	9.00	7.87½	9.00	5.00	9.00
Carbonate, 400 lb bbls..lb.	...	.08¼	...	.08¼	.07	.08
52-54% bbls.....lb.	.15½	.16¼	.15½	.16	.15¾	.17¼
Chloride, 250 lb bbls....lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs.....lb.	.37	.38	.37	.40	.39	.40
Oleate, precip., bbls.....lb.	...	.20	...	.20	...	...
Oxide, red, 100 lb bbls..lb.	.15	.17	.12½	.17	.14¾	.15
Resinate, precip., bbls..lb.	.18	.19	.18	.19	...	...
Stearate, precip., bbls...lb.	.35	.40	.35	.40	...	...
Sub-acetate verdigris, 400 lb. bbls.....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls c-l wks. 100 lb.	...	3.85	3.75	3.85	3.00	3.75
Copperas, crys and sugar bulk c-l wks bags.....ton	14.00	14.50	14.00	14.50	14.00	14.50
Corn Syrup, 42 deg., bbls. ..... 100 lb.	...	3.49	3.04	3.59	2.61	3.04
43 deg., bbls....100 lb.	...	3.54	3.09	3.64	2.66	3.09
Cotton, Soluble, wet, 100 lb. bbls. .....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd., & gran., 300 lb. bbls..lb.	...	.18¼	.17½	.19½	.14½	.17¾
Creosote, USP., 42 lb cbys lb.	.45	.47	.45	.47	.40	.47
Oil, Grade 1 tanks...gal.	.11	.12	.11	.12	.11	.12
Grade 2.....gal.	.10	.12	.10	.12	.10	.12
Grade 3.....gal.	.09	.12	.09	.12	.09	.12
Cresol, USP. drums....lb.	...	.11	...	.11	.10½	.11
Crotonaldehyde, 98% 50 gal. dr. .....lb.*	.26	.30	.26	.30	.32	.36
Cudbear, English .....lb.	.19	.25	.19	.25	.16	.25
Cutch, Rangoon, 100 lb. bales .....lb.	...	.02¾	...	.02¾	.02½	.03
Borneo, Solid, 100 lb. bale .....lb.	...	.04½	...	.04½	.02½	.04½
Philippine, 100 lb bale .lb.	.03½	.04¾	.03½	.04¾	...	...
Cyanamid, bags c-l frt allowed Ammonia unit..	...	1.07½	...	1.07½	.97½	1.07½
Dextrin, corn, 140 lb bags ..... 100 lb.	...	3.95	3.50	4.20	2.89	3.84
British Gum, bags 100 lb.	...	4.20	3.75	4.60	3.89	3.92
White, 140 lb. bags 100 lb.	4.00	3.90	3.47	4.20	2.94	3.79
Potato Yellow, 220 lb bgs .....lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.09
White, 220 lb bags 1c-l lb	.08	.09	.08	.09	.08	.09
Tapioca, 200 bags 1c-l .lb.	.06¾	.07¾	.06¾	.07¾	.06¾	.08
Diamylamine, drums, wks.lb.	...	1.00	...	1.00	...	...
Diamylene, drums, wks...lb.	.095	.102	.09	.102	...	...
tanks, wks .....lb.	...	.08½	...	.08½	...	...
Diamylether, wks., drums..lb.	.085	.092	.09	.77	...	...
tanks, wks .....lb.	...	.075	...	...	...	...
Diamylphthalate, drs wks.gal.	...	.20½	...	.20½	...	...
Diamyl Sulfide, drms, wks.lb.	...	1.10	...	1.10	...	...
Dianisidine, barrels .....lb.	2.35	2.45	2.35	2.45	2.35	2.70
Dibutylphthalate, drs, wks..lb.	.22	.23	.20½	.21	.20½	.22
Dibutyltartrate, 50 gal drs lb.	.29½	.31½	.29½	.31½	.29½	.21
Dichlorethylene, drums...gal.	.29	...	.29	...	...	...
Dichloroethylether, 50 gal drs. .....lb.	...	.21	...	.21	.16	.21
Dichloromethane, drs wks.lb.	...	.15	...	.15	...	...
tanks, wks .....lb.	...	.02½	...	.02½	...	...
Dichloropentanes, drums, wks. .....lb.	.032	.040	.0278	.040	...	...
tanks, wks.....lb.	...	.02½	...	.02½	...	...
Diethylamine, 400 lb drs..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethyl Carbinol, drums..lb.	.60	.75	.60	.75	...	...
Diethylcarbonate, com. drs lb.	...	.35	...	.35	...	...
90% grade, drs.....lb.	...	.25	...	.25	...	...
Diethylaniline, 850 lb drs lb.	.52	.55	.52	.55	.52	.55
Diethyleneglycol, drs ....lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs.lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs ..... lb.	.26	.27	.26	.27	.26	.27
Diethylorthotoluidin, drs..lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb. drums .....lb.	.26	.27	.26	.27	.20	.26
Diethysulfate, technical, 50 gal drums .....lb.	...	...	...	...	...	...
Diglycol Oleate, 5bls.....lb.	...	.18	.16	.18	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis .....lb.	...	.95	.95	1.20	...	...
Dimethylaniline, 340 lb drs lb.	.29	.30	.29	.30	.25	.28
Dimethyl Ethyl Carbinol, drs. .....lb.	.60	.75	.60	.75	...	...
Dimethyl phthalate drs....lb.	.23	.24	.24	.24½	...	...
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb.	.17	.19½z	.17	.19½z	...	.18
Dintrochlorobenzene, 400 lb bbls. .....lb.	.14	.15½	.14	.15½	.13	.15
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	...	.16½	.15½	.16½	.15	.17
Dioxan (See Diethylene Oxide)	...	...	...	...	...	...
Diphenyl .....lb.	.15	.25	.15	.25	.15	.40
Diphenylamine .....lb.	.33	.34	.31	.34	.31	.34
Diphenylguanidine, 100 lb bbl ..... lb.	.36	.37	.36	.37	.30	.37
Dip Oil, 25%, drums.....lb.	.23	.25	.23	.25	.23	.25
Divi Divi pods, bgs shipmt .....ton	36.00	40.00	35.00	40.00	26.00	36.00
Extract .....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb. cases..lb.	.45	.47	.40	.47	.40	.43
Epsom Salt, tech, 300 lb bbls c-l NY .....100 lb.	...	2.25	2.20	2.25	...	2.20
Ether, USP anaesthesia 55 lb drs .....lb.	.22	.23	.22	.24	.22	.24
(Conc) .....lb.	.09	.10	.09	.10	.09	.10

‡Higher price refined. xTanks 2c lower. zHigher price for purified.

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META-PHENYLENEDIAMINE
META-TOLUIDINE
META-TOLYLENEDIAMINE
META-XYLIDINE

DU PONT
REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS & COMPANY, INC.
Organic Chemicals Department
Wilmington, Delaware

Ether, Isopropyl, Gum Copal Congo — Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Ether, Isopropyl 50 gal. drums ..... lb.	.07‡x	.08	.07‡x	.08	.07	.08
Synthetic, wks, drums..lb.	.08	.09	.08	.09	...	...
Ethyl Acetate, 85% Ester tanks .....lb.	.07½	.08	.07½	.08	.07½	.09
drums .....lb.	.08½	.09	.08½	.09	.08½	.10
Anhydrous, tanks .....lb.	.09	.10	.09	.10	.09	.10
drums .....lb.	.10	.10¼	.10	.10¼	.10	.10¼
Acetoacetate, 50 gal drs lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums..lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drums..lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate cbys...lb.	...	.30	...	.30	...	.30
Crotonate, drums.....lb.	1.00	1.25	1.00	1.25	...	...
Ether, Absolute, 50 gal drs .....lb.	.50	.52	.50	.52	.50	.52
Lactate, drums works..lb.	.25	.29	.25	.33	.25	.29
Methyl Ketone, 50 gal drs ..... lb.	.08½	.09	.08½	.09	...	.12½
Oxalate, drums works.lb.	.37½	55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks .....lb.	.30	.30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb dr .....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont.....lb.	.75	.85	.75	.85	.75	.85
Dichloride, 50 gal drums lb.	.06	.09	.05½	.09	.05	.09
Glycol, 50 gal drs wks lb.	.26	.28	.26	.28	.25	.28
Mono Butyl Ether drs wks	...	.20	...	.20	...	.20
Mono Ethyl Ether drs wk.	.16	.17	.15	.17	.15	.17
Mono Ethyl Ether Acetate dr wks.....	17½	.18	.16½	.18	.16½	.18
Mono Methyl Ether, drs ..... lb.	.21	.23	.21	.23	.21	.23
Stearate	.18	.18	.18	.18	.18	.18
Oxide, cyl.....lb.	...	.75	...	.75	...	.75
Ethylidenaniline .....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk pottery...ton	...	14.50	...	14.50	14.00	16.50
Powdered, bulk works.ton	13.50	14.50	13.50	14.50	13.50	14.50
Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.05	.07½	.05	.07½	.04½	.07½
Fish Scrap, dried, wks..unit	...	2.50	2.25•	2.60•	1.85	2.75•
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis .....unit	...	2.00‡	2.00‡	2.50‡	1.85‡	2.50‡
Fluorspar, 98%, bags.....28.00		35.50	28.00	35.50	28.00	35.50
Formaldehyde, aniline, 100 lb. drums .....lb.	.37½	.42	.37½	.42	.37½	.42
USP, 400 lb bbls wks.lb.	.06	.07	.06	.07	.06	.07
Fossil Flour .....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, bulk, mines ..... ton	6.50	15.00	6.50	15.00	15.00	20.00
Imp. powd c-l bags...ton	24.00	30.00	23.00	30.00	24.00	30.00
Furfural (tech.) drums wks ..... lb.	.10§	.15	.10§	.15	.10	.15
Furfuramide (tech) 100 lb dr ..... lb.	...	.30	...	.30	...	.30
Furfuryl Acetate, 1 lb tins lb.	...	5.00	...	5.00	...	5.00
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.14½	.18
Fustic, chips .....lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb. boxes..lb.	.20	.23	.20	.23	.18	.23
Liquid 50°, 600 lb. bbls.lb.	.08½	.12	.08½	.12	.07	.10
Solid, 50 lb. boxes.....lb.	.16	.18	.16	.18	.14	.18
Sticks .....ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls.lb.	.42	.43	.42	.43	.42	.43
Gall Extract .....lb.	.18	.20	.18	.20	.18	.20
Gambier, com. 200 lb. cs...lb.	...	.06¼	.04	.06¼	.03	.07
Singapore cubes, 150 lb. bg. ..... 100 lb.	...	.07¼	.05	.07¼	.05¼	.08
Gelatin, tech, 100 lb cases.lb.	.50	.55	.45	.55	.45	.50
Glauber's Salt, tech, c-l wks. .....100 lb.	1.10	1.30	1.10	1.30	1.00	1.70
Glucose (grape sugar) dry 70-80° bags c-l NY.100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb. bags .....100 lb.	...	2.33	...	2.33	...	2.33
Glue, bone, com. grades, c-l bags .....lb.	.07	.12½	.08	.12½	...	...
Better grades, c-l, bags.lb.	.12½	.16	.12½	.16	...	...
Casein, kegs .....lb.	.18	.22	.18	.22	...	...
Hide, high grd, c-l. bags.lb.	.23	.28	.23	.28	...	...
Med. grd, c-l, bags..lb.	.19	.23	.19	.23	...	...
Low grade, c-l, bags..lb.	.13½	.19	.13½	.19	...	...
Glycerin, CP, 550 lb drs..lb.	...	.14	.11	.14	.10¼	.11
Dynamite, 100 lb drs..lb.	.13	.13¾	.10	.13¾	.07½	.10¼
Saponification, tanks ..lb.	...	.10½	.06¾	.10½	.05	.08
Soap Lye, tanks .....lb.	...	.09	.06¾	.09⅛	.04	.06½
Glyceryl Phthallate .....lb.	...	.28	...	.28	...	...
Glyceryl Stearate, bbls.....lb.	...	.18	...	.18	.17	.18
Glycol Phthallate .....lb.	...	.28	...	.28	...	...
Glycol Stearate .....lb.	...	.20	...	.20	...	...
Graphite, Crystalline, 500 lb bbls..lb.	.04	.05	.04	.05	.04	.05
Flake, 500 lb. bbls.....lb.	.08	.16	.08	.16	.08	.16
Amorphous, bbls. .....lb.	.03	.04	.03	.04	.03	.04
GUMS						
Gum Aloes, Barbadoes....lb.	.87	.90	.85	.90	.85	.90
Animi (Zanzibar) bean & pea, 250 lb. cases.....lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases.....lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts.....lb.	.09⅜	.10	.07¾	.10⅝	.05¾	.08¼
Asphaltum, Barbadoes (Manjak) 200 lb bags.....lb.	.03	.04	.03	.06	.03	.05
Egyptian, 200 lb cases..lb.	.12	.15	.12	.15	.13	.15
Benzoin Sumatra, U.S.P. 120 lb. cases .....lb.	.18	.18½	.18½	.23	.17	.23
Copal Congo, 112 lb. bags, clean, opaque† .....lb.	.24½	.24⅝	.24½	.28	.16½	.28
Dark, amber† .....lb.	.08¾	.09¾	.08⅝	.10½	.06	.10½
Light, amber† .....lb.	.14⅝	.14⅞	.14⅜	.19	.08	.19

† Carlot (min. 30,000 lbs.) prices apply to assorted lots as well as carlot quantities of a single grade.
• & 10; ‡ & 50. § Tanks, lc lower.

Current

Gum Copal Congo Linseed Cake

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Copal Congo water, white† lb.	.41⅝	.42⅛	.41⅝	.48	.37	.48
Damar Batavia standard 136, lb. cases† ....lb.	.13¼	.13¾	.12⅞	.13¾	.08½	.15½
Batavia Dust, 160 lb bags†..lb.	.05¾	.06¼	.05¾	.07	.04	.07½
E Seeds, 136 lb cases†..lb.	.07½	.08	.07½	.09½	.05½	.09½
F Splinters, 136 lb cases and bags ....lb.	.06⅛	.06⅝	.05½	.06⅝	.05½	.06
Singapore, No. 1, 224 lb cases†....lb.	.16½	.17	.15½	.18	.09½	.18
No. 2, 224 lb cases†....lb.	.10⅜	.10⅞	.09⅜	.11	.07	.11½
No. 3, 180 lb bags†....lb.	.05½	.06	.05⅛	.07	.04½	07½
Gum Ester, light ....lb.	.06¾	.07½	.06	.07½	...	...
Copal Manila 180-190 lb. baskets Loba A† ....lb.	.11⅜	.11⅞	.11⅜	.14½	.09	.13½
Loba B† ....lb.	.10¼	.10¾	.10¼	.13½	.08	.13
Loba C† ....lb.	.09¾	.10¼	.09¾	.12	.07	.12
M A Sorts† ....lb.	.07	.07¼	.06½	.07½	.05	.07
D B B Chips† ....lb.	.08	.08½	.08	.09½	.05¾	.09½
Copal East Indies chips, 180 lb. bags† .... lb.	.04	.04½	.04	.05	.04	.07
Pale bold, 224 lb cs†..lb.	...	.17	.16	.17	.05½	.17
Pale nubs, 180 lb bags†.lb.	.10½	.10¾	.10½	.13	.05	.13
Copal Pontianak, 224 lb cases Bold gen No. 1†....lb.	.17⅝	.18½	.17½	.19	.14	.18½
Gen. chips spot†....lb.	.07⅜	.08⅛	.07¼	.08¼	.05	.08
Elemi, No. 1, 80-85 lb cs..lb.	.09⅛	.09⅝	.09¾	.11½	.09	.12½
No. 2, 80-85 lb cases..lb.	.09¼	.09½	.09¼	.11¼	.08½	.12
No. 3, 80-85 lb cases..lb.	.08	.08½	.08	.08½	.08	.08½
Gamboge, pipe, cases....lb.	.60	.65	.57	.65	.42	.65
Powdered, bbls ....lb.	.70	.75	.67	.75	.50	.70
Ghatti, sol. bags....lb.	.09	.09½	.09	.09½	.06	.09½
Karaya, pow. bbls xxx....lb.	.23	.25	.23	.25	...	...
xx ....lb.	.15	.16	.15	.16	...	...
No. 1 ....lb.	.08	.09	.08	.11	...	...
No. 2 ....lb.	.07	.08	.07	.09	...	...
Kauri, 224-226 lb cs No. 1†lb.	.19	.19½	.19	.25	.20	.25
No. 2 fair pale†....lb.	.14½	.15	.12½	.16	.12½	.16
Brown Chips, 224-226 lb. cases† ....lb.	.06½	.08½	.06½	.08½	.06½	.12
Bush Chips, 224-226 lb. cases† ....lb.	.22	.22½	.22	.24	.22	.24
Pale Chips, 224-226 lb. cases† ....lb.	.11½	.14	.11	.14	.11	.14
Kino, tins ....lb.	.75	.80	.75	.80	...	..
Mastic† ....lb.	.55	.55½	.35	.55½	.26⅞	.40
Sandarac, prime quality, 200 lb bags & 300 lb casks.lb.	.48	.48½	.44	.50	.21	.50
Senegal, picked bags....lb.	.20	.21	.17	.21	...	...
Sorts ....lb.	.09⅜	.10	.08	.10	...	...
Thus, bbls. ....280 lbs.	...	10.50	9.50	10.50	...	...
Strained ....280 lbs.	...	10.75	9.50	10.75	...	...
Tragacanth, No. 1 bags....lb.	1.15	1.20	1.00	1.20	.65	1.00
Yacca, bags ....lb.	.03¼	.03¾	.03¼	.04	...	...
Hematine crystals, 400 lb bbls. ....lb.	.16	.18	.16	.18	.10	.18
Paste, 500 bbls....lb.	...	.11	...	.11	...	.11
Hemlock 25%, 600 lb. bbls. wks. ....lb.	.03½	.04½	.03½	.04½	.03½	.04½
Bark ....ton	...	16.00	...	16.00	...	16.00
Hexalene, 50 gal drs wks..lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70°C. Group 3, tanks....gal.	...	.14	...	.14	...	...
Hexamethylenetetramine, drums ....lb.	.37	.39	.37	.39	...	...
Hoof Meal, fob Chicago unit	..	2.25	1.85	2.60	.75	1.75
South Amer. to arrive.unit	...	1.85	1.65	1.80	1.40	1.75
Hydrogen Peroxide, 100 vol, 140 lb cbys....lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride .... lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls.lb.	.17	.20	.17	.20	.11	.20
Indigo Madras, bbls....lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums....lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid ....lb.	...	.12	...	.12	...	.12
Iodine, crude ....per kilo	...	15s 1d	...	15s 1d	...	...
Resublimed, kegs ....lb.	...	1.90	1.90	2.30	2.10	3.40
Irish Moss, ord. bales....lb.	.07	.08	.07	.08	...	...
Bleached, prime, bales..lb.	.14	.15	.14	.15	...	...
Iron Acetate Liq. 17°,bbls.lb.‡	.03	.04	.03	.04	...	...
Iron Chloride see Ferric or Ferrous Nitrate, kegs ....lb.	.09	.10	.09	.10	.09	.10
Coml, bbls. ....100 lb.	2.75	3.25	2.75	3.25	2.50	3.25
Oxide, English....lb.	.08¾	.09	.08¾	.09	.04	.07
Isobutyl Carbinol (128-132°C) drums, wks ....lb.	.33	.34	.34	.34	...	.34
tanks wks lb ....lb.	...	.32	.32	.326	...	...
Isopropyl Acetate, tanks...lb.	...	.07½	.07	.07½	...	...
Japan Wax, 224 lb cases..lb.	...	.07	.06	.08	.05½	.08
Keiselguhr, 95 lb. bgs. N.Y. Brown ....ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate,bbls wks.100 lb.	...	9.50	...	9.50	8.50	9.50
White crystals, 500 lb bbls Linoleate, solid bbls....lb.	.26	.26½	.26	.26½	...	...
Arsenate, drs cl-lcl. wks.lb.	.09	.10½	.07	.18	.09	.10½
wks ....100 lb.	...	10.50	...	10.50	9.50	10.50
Metal, c-l NY ....100 lb.	...	3.70	3.60	4.25	3.00	4.50
Nitrate, 500 lb bbls wks.lb.	.10	.14	.10	.14	.10	.14
Oleate, bbls. ....lb.	.15	.16	.15	.16	.15	.16
Lead Oxide Litharge, 500 lb. bbls. ....lb.	.052	.06¼	.051	.06¾	.05½	.07
Red, 500 lb Bbls wks lb.	.06	.067	.06	.07¾	.06½	.08
Resinate, precip., bbls..lb.	...	.14	.14	18½	...	...
Stearate, bbls ....lb.	.22	.23	.22	.23	...	...
White, 500lb bbls wks.lb.	.06½	.07	.06½	.07	.06	.07
Sulfate,500lb bbls wks.lb.	...	.06	...	.06	.05½	.06
Lime, ground stone bags.ton	...	9.25	4.50	9.25	...	4.50
Lime Salts, see Calcium Salts						
Lime-Sulfur soln bbls....gal.	.13½	.40	.13	.40	.15	.17
Linseed cake, bags....ton	31.50	30.00	21.50	33.00	...	...

‡Higher price for lcl quantities.

† Carlot (min. 30,000 lbs.) prices apply to assorted lots as well as carlot quantities of a single grade.

The following

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MIXED-MONONITROCHLORO-BENZENES
MIXED-MONONITROTOLUENES
MIXED-MONONITROXYLENES
MIXED-TOLUIDINES
MIXED-XYLIDINES
MONOBENZYL PARA-AMINOPHENOL
MONOCHLOROBENZENE
MONOETHYLANILINE
MONOETHYL-ORTHO-TOLUIDINE
NEVILE & WINTHER'S ACID
NITROBENZENE
NITROBENZENE-META-SULFONIC ACID
NITRO FILTERS
OIL OF MIRBANE
ORTHO-AMINOPHENOL
ORTHO-ANISIDINE
ORTHO-DICHLOROBENZENE
ORTHO-NITROANISOLE
ORTHO-NITROCHLOROBENZENE
ORTHO-NITROPHENOL
ORTHO-NITROTOLUENE
ORTHO-TOLUIDINE
ORTHO-TOLUIDINE-META-SULFONIC ACID
PARA-AMINOBENZOIC ACID
PARA-AMINOPHENOL (BASE)
PARA-DICHLOROBENZENE
PARA-NITROANILINE-ORTHO-SULFONIC ACID
PARA-NITROBENZOIC ACID
PARA-NITROCHLOROBENZENE
PARA-NITROPHENOL
PARA-NITROTOLUENE
PARA-PHENETIDINE
PARA-TOLUIDINE
PERI ACID
PHENYL-ALPHA-NAPHTHYLAMINE
PHENYL-BETA-NAPHTHYLAMINE
PHENYL GAMMA ACID
PHENYL-METHYL-PYRAZOLENE
PHENYL PERI ACID
PICRAMIC ACID
PICRIC ACID
RESORCINOL, TECHNICAL
R SALT
S ACID
SCHAEFFER SALT
SODIUM METANILATE
SODIUM NAPHTHIONATE
SODIUM PARA-NITROPHENOLATE
SODIUM PICRAMATE
STABILIZERS
SULFANILIC ACID
SULFUR DIOXIDE
THIOCARBANILIDE
TOLIDINE (BASE)
TRIBUTYLAMINE

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REG. U.S. PAT. OFF.

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Specialists in Chemical Lead Burning, and Experienced in design of Chemical Equipment made of lead. Our products cover practically everything in Chemical line where Lead or Block Tin is used.

708-10 MYRTLE AVE., BROOKLYN, N.Y.

Linseed Meal
Orange-Mineral

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Linseed Meal, bags.....ton	38.50	41.00	30.50	41.00	28.00	37.00
Lithopone, 400 lb bbls lc-l wks .....lb.	.04¾	.05	.04¾	.05	.04¾	.05
Logwood, 51°, 600 lb bbls.lb.	.08½	.12½	.08½	.12½	.05	.12½
Solid, 50 lb boxes.....lb.	.14½	.17½	.14½	17½	.08	.17½
Sticks .....ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch .....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl.ton	60.00	65.00	55.00	65.00	46.00	65.00
Magnesium Carb, tech, 70 lb. bags NY .....lb.	...	.06½	...	.06½	.05¾	.06½
Chloride flake, 375 lb drs c-l wks .....ton	36.00	39.00	34.00	39.00	34.00	36.00
Imported shipment ...ton	31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY ..... ton	..	31.00	...	31.00	...	31.00
Magnesium Fluosilicate, crys, 400 lb bbls, wks.....lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb. bbls .....lb.	...	.42	...	.42	...	.42
Heavy, 250 lb bbls....lb.	...	.50	...	.50	...	.50
Palmitate, bbls. .....lb.	.22	.23	.21	.23	...	...
Stearate, bbls. .....lb.	.19	.22	...	...	...	...
Linoleate, lig. drums....lb.	.18	.19	.18	.19	...	...
Resinate, fused, bbls....lb.	.08¼	.08½	.08¼	.08½	...	...
precip., bbls. .....lb.	...	.12	.11½	.12½	...	...
Sulfate, Anhyd., 550 lb drs N Y .....lb.	.09	.09½	.08	.09½	.07	.08
Manganese Borate, 30%, 200 lb. bbls. .....lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb casks..lb.	.07	.08	.07	.08	.07	.08
Dioxide, tech (peroxide) drs ..... lb.	.03¾	.06	.03¾	.06	.03½	.06
Mangrove 55%,400 lb bbls.lb.	...	.04	...	.04	...	.04
Bark, African .....ton	...	29.00	26.00	32.00	22.00	31.00
Marble Flour, bulk.....ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride .....lb.	.88	.93	.82	.93	.67	.87
Mercury metal ...76 lb. flask	...	73.50	66.50	79.00	48.00	69.00
Meta-nitro-aniline .....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-para-oluidine 200 lb. bbls .....lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls .....lb.	.80	.84	.80	.84	.80	.84
Peroxide, 100 lb cs.....lb.	1.20	1.25	1.20	1.25	1.00	1.25
Silicofluoride, bbls .....lb.	.09	.10	.09	.11	.08¾	11.
Stearate, bbls .....lb.	.19	.20	.19	.20	.16½	.20
Meta-toluene-diamine, 300 lb. bbls .....lb.	.67	.69	.67	.69	.67	.69
Methanol (Wood Alcohol)						
*Crude, tanks .....gal.	...	.25	...	.25	.20	.20
95% tanks .....gal.	.33	.35	.33	.35	.33	.35
97% tanks .....gal.	.34	.39	.34	.39	.34	.39
*Pure, Synthetic drs cars.gal.	...	.40	...	.40	.37½	.40
*Synthetic, tanks .....gal.	...	.35½	...	.35½	...	.35½
*Denat. grade, tanks....gal.	...	.43	.40	.43	.35	.40
Methyl Acetate drs 82%.gal.	.12	.13	.12	.13	.12	.13
99% tanks .....gal.	...	.15	...	.15	...	.15
Acetone, drums† .....gal.	.53½	.56	.53½	.57	.43	.57
Hexyl Ketone, pure...lb.	...	1.20	...	1.20	...	1.20
Anthraquinone .....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tanks....lb.	...	.10½	.10½	.10½	...	...
Cellosolve (See Ethylene Glycol Mono Methyl Ether)						
Chloride, 90 lb cyl.....lb.	.45	.45	.45	.45	.45	.45
Ethyl Ketone, tanks.....lb.	...	.07½	.07½	.07½	...	...
Propyl carbinol, drums..lb.	.60	.75	.60	.75	...	...
Mica, dry grd. bags wks..lb.	65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs....lb.	...	2.50	...	2.50	2.50	3.00
Molasses, blackstrap, tanks f.o.b. N. Y. .....gal.	.06	.06¼	.06	.09	.04½	.07
Monoamylamine, drs, wks.lb.	...	1.00	...	1.00	...	...
Monochlorobenzene, drums, see Chlorobenzene, mono.						
Monomethylparaminosulfate, 100 lb drums.....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags lb.	...	.11	.10	.11	.03¾	.10
Myrobalans 20%, liq bbls..lb.	.03¾	.04¼	.03¾	.04¼	.03¼	.04¼
50% Solid, 50 lb boxes.lb.	.06	.06¼	.06	.06¼	.05	.06¼
J1 bags .....ton	...	24.50	24.50	32.00	27.00	35.00
J2 bags .....ton	...	16.50	16.00	18.00	15.00	22.00
R2 bags .....ton	16.00	16.50	16.25	18.00	15.00	22.00
Naphtha. v.m. & p. (deodorized) tanks, Group 3 tanks .....gal.	...	.06⅞	.06¼	.07¼	...	...
Bayonne, tanks.....lb.	...	.09	.09	.09½	.08½	.09½
Naphthalene balls, 250 lb bbls wks. .....lb.	.06	.07	.06	.07	.05½	.07
Crude, imp .....100 lb.	1.15	1.90	1.75	2.15	1.75	2.15
Crushed, chip. bgs wks..lb.	...	.05	...	.05	...	.05
Flakes, 175 lb bbls wks.lb.	...	.07¼	...	.07¼	...	.07¼
Nickel Chloride, bbls.....lb.	.18	.19	.18	.19	.17	.19
Oxide, 100 lb kegs NY..lb.	.35	.37	.35	.37	.35	.37
Salt bbl 400 bbls lb NY.lb.	.11½	.12	.11½	.12	.11	.13
Single, 400 lb bbls NY.lb.	.11½	.12	.11½	.12	.11	.12
Metal ingot.....lb.	.35	.35	.35	.35	.35	.35
Nicotine, free 40%, 8 lb tins, cases	8.25	10.15	8.25	10.15	...	...
Sulfate, 55 lb. drums...lb.	.67	.75	.67	.75	.67	.75
Nitre Cake, blk.....ton	12.00	14.00	12.00	14.00	10.00	14.00
Nitrobenzene, redistilled, 1000 lb. drs wks‡.....lb.	.08½	.11	.08½	.11	.08½	.11
Nitrocellulose, c-l-l-cl, wks.lb.	.27	.33	.27	.33	.27	.33
Nitrogenous Mat'l., bulk.unit	2.55	2.60	2.35	3.25	1.50	3.50
Nitronaphthalene, 550 lb bbls. .....lb.	.24	.25	.24	.25	.24	.25
Nutgalls Aleppy, bags....lb.	...	.18	...	.18	...	.18
Chinese. bags.....lb.	.17	.18	.17	.18	.17	.18
Oak Bark, ground.....ton	30.00	35.00	30.00	35.00	30.00	35.00
Whole .....ton	20.00	23.00	20.00	23.00	20.00	23.00
Extract, 25% tan., bbls..lb.	.03½	.03½	.03½	.03½	...	...
Orange-Mineral, 1100 lb casks NY ..... lb.	.09¼	.10	.09¼	.10½	.09½	.10¼

* Delivered basis (east of Miss. River). ‡ Higher price is for lcl quantities. † Zone 1 prices; other zone prices vary.

Current — Orthoaminophenol Phosphorous Oxychloride

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Orthoaminophenol. 50 lb kgs. ....lb.	2.15	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs.lb.	1.00	1.00	1.15	1.00	1.15
Orthochlorophenol, drums.lb.	.50	.50	.65	.50	.65
Orthocresol, drums.....lb.	.13	.13	.15	.13	.15
Orthodichlorobenzene, 1000 lb. drums .....lb.	.05½	.05½	.06	.05½	.06
Orthonitrochlorobenzene, 1200 lb drs wks.....lb.	.28	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs wk .....lb.	.05½	.05½	.06	.05½	.06
Orthonitrophenol, 350 lb dr. .....lb.	.52	.52	.80	.52	.90
Orthotoluidine, 350 lb bbl l-c-l .....lb.	.14	.14	.15	.14	.22
Orthonitroparachlorphenol, tins .....lb.	.70	.70	.75	.70	.75
Osage Orange, crystals...lb.	.16	.16	.17	.16	.17
51 deg. liquid.....lb.	.07	.07	.07¾	.06	.07¾
Powdered, 100 lb bags..lb.	.14½	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P.....lb.	.047	.04¾	.04½	.04¾	.02 .04½
128-132 deg. M. P.....lb.	.0505	.0515	.04¾	.0515	.03½ .04¾
133-137 deg. M. P.....lb.	.0575	.07	.05	.07	.043 .05¾
Para Aldehyde, 110-55 gal. drs. .....lb.*	.16	.18	.16	.18	.16 .18
Aminoacetanilid, 100 lb. bg. .....lb.	.52	.60	.52	.60	.52 .60
Aminohydrochloride, 100 lb. kegs .....lb.	1.25	1.30	1.25	1.30	1.25 1.30
Aminophenol, 100 lb kgs.lb.	.78	.80	.78	.80	.78 .80
Chlorophenol, drums....lb.	.50	.65	.50	.65	.50 .65
Coumarone, 330 lb drs..lb.	...	...	...	...	... ...
Cymene, refd, 110 gal dr. .....gal.	2.25	2.50	2.25	2.50	2.25 2.50
Dichlorobenzene, 150 lb bbls wks.....lb.	.16	.20	.16	.20	.15 .18
Nitroacetanilid, 300 lb. bbls .....lb.	.45	.52	.45	.52	.45 .52
Nitroaniline, 300 lb bbls wks .....lb.	.48	.55	.48	.55	.48 .55
Nitrochlorobenzene, 1200 lb. drs. wks.....lb.	.23½	.24	.23½	.24	.23½ .26
Nitro-orthotoluidine, 300 lb. bbls .....lb.	2.75	2.85	2.75	2.85	2.75 2.85
Nitrophenol 185 lb bbls.lb.	.45	.50	.45	.50	.45 .50
Nitrosodimethylaniline, 120 120 lb. bbls.....lb.	.92	.94	.92	.94	.92 .94
Nitrotoluene, 350 lb bbls.lb.	.35	.37	.35	.37	.29 .37
Phenylenedamine, 350 lb bbls. .....lb.	1.25	1.30	1.25	1.30	1.15 1.30
Para Tertiary amyl phenol wks, drums .....lb.	...	.50	...	.50	... ...
Toluenesulfonamide, 175 lb bbls. .....lb.	.70	.75	.70	.75	.70 .75
Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.20	.22	.20 .22
Toluidine, 350 lb bbls wk .....lb.	.56	.60	.56	.60	.56 .60
Paris Green, Arsenic Basis 100 lb kegs.....lb.	...	.23	...	.23	... .24
250 lb kegs.....lb.	...	.22	...	.22	... .23
Perchlorethylene, 50 gal dr.lb.	...	.15	...	.15	... ...
Persian Berry Ext, bbls..lb.	.25	Nom.	.25	Nom.	.25 Nom.
Pentane, normal, 28-38° C, group 3, tanks.....gal.	...	.09	...	.09	... ...
Pentasol (see Alcohol, Amyl)					
Pentasol Acetate (see Amyl Acetate)					
Petrolatum, Green, 300 lb. bbl. .....lb.	.01⅞	.02	.01⅞	.02	.01⅞ .02
Petroleum Ethers, tks. 30-60°, Group 3.....gal.	...	.13	.11	.13	.10 .11
Petroleum solvents and diluents					
Cleaners' naphtha, Group 3, tanks .....gal.	...	.06⅞	.06¼	.07⅜	.05 .07¾
Lacquer diluents, Bayonne, tanks .....gal.	.12	.12½	.12	.12½	.12 .12¾
Group 3, tanks....gal.	.07⅞	.08	.06⅞	.08¾	.06¼ .08⅛
Petroleum thinner 47-49° tanks, Group 3.....gal.	...	.05⅞	.05⅞	.06⅜	... ...
Rubber solvent, stand. grade tanks, Group 3.gal.	...	.06⅞	.06⅜	.06⅞	.05 .06⅞
East Coast tanks....gal.	...	.09½	...	.09½	.09 .09½
Stoddard solvents 48-50 deg. tanks, Group 3.....gal.	...	.06⅜	.05¾	.07⅛	.04½ .06⅝
East Coast tanks....gal.	...	.09	.09	.09½	.09 .09½
Phenol, 250-100 lb drums.lb.	.14¼	.15	.14¼	.15	.14¼ .15
Phenyl-Alpha-Naphthylamine, 100 lb kegs.....lb.	...	1.35	...	1.35	... 1.35
Phenyl Chloride, drums..lb.	...	.16	...	.16	... ...
Phenylhydrazine Hydrochloride .....lb.	2.90	3.00	2.90	3.00	2.90 3.00
Phloroglucinol, tech.....lb.	15.00	16.50	15.00	16.50	... ...
CP .....lb.	20.00	22.00	20.00	22.00	... ...
Phosphate Acid (see Superphosphate)					
Phosphate Rock, f.o.b. mines Florida Pebble, 68% basis .....ton	...	3.25	2.85	3.25	2.75 3.25
70% basis .....ton	...	3.75	3.35	3.75	3.25 3.90
72% basis .....ton	...	4.25	3.85	4.25	3.75 4.35
75-74% basis .....ton	...	5.25	4.90	5.30	4.75 5.50
75% basis .....ton	...	5.35	5.05	5.40	4.85 5.75
77-80% basis .....ton	...	6.25	5.90	6.25	5.75 6.30
Tennessee, 72% basis..ton	...	4.75	4.75	5.00	... 5.00
Phosphorous Oxychloride 175 lb. cyl.....lb.	.16	.20	.16	.20	.16 .23
Red, 110 lb cases.....lb.	.44	.45	.44	.45	.40 .45
Yellow, 110 lb cs wks.lb.	.28	.33	.28	.33	.27½ .33

* Higher price is for lcl quantities.

' ' ' Recent CHEMICAL Developments

XI

1. INSECTICIDES

Pine Oil is used in insecticides and fungicides to increase the efficiency of other toxic agents used in these preparations. Cattle sprays, poultry sprays, fly sprays, tree and plant sprays, and washes for fruits advantageously contain pine oil.

2. NEW RESINS

Vinsol resins are very dark colored and hard. They consist chiefly of highly oxidized abietic acid and other resin acids. Their melting points are high and they are comparatively insoluble in petroleum oils and in most drying and non-drying oils. They are a valuable addition to the materials for protective coatings, especially varnishes, stains, and lacquers.

3. WITHSTANDS HIGH TEMPERATURES

Medical instruments made of wood, which must be sterilized in a solution at 200° F, have been satisfactorily treated with nitrocellulose lacquer. This suggests that the same material may find other applications where a finish is needed that will not be injured by immersion in boiling water.

4. TEXTILE DETERGENT

Special pine oils have been developed for combination with soap as a textile detergent. Several textile detergents containing these pine oils are already on the market.

5. WALLBOARD FINISH

Nitrocellulose lacquers applied to press board provide a waterproof finish and enable the dealer to supply the board in attractive colors, eliminating the necessity for painting by the user.

6. FOR PROPERLY PROTECTED SURFACES

Because Hercules Steam-distilled Wood Turpentine is a superior product for use in good paints and varnishes, it has exactly the proper rate of evaporation, uniform thinning properties, freedom from high-boiling or oxidized bodies, and freedom from offensive odors. It helps protective coatings to cover the greatest possible space and, after drying, leaves a tough and durable film of paint or varnish properly adhering to the covered surface.

More detailed information on any of the above subjects may be secured by filling in this coupon.

HERCULES POWDER COMPANY
INCORPORATED
Wilmington, Delaware

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Address.....

Company.....

IN-21-C

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Anhydrous Ammonia
Aqua Ammonia

distributors of:—

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Tri-sodium Phosphate

Established 1858

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CHARLESTON, W. VA.

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RESORCIN AND PHLOROGLUCINOL
(Technical—C. P.)

PENNSYLVANIA COAL PRODUCTS CO.
Established 1916
Petrolia **Pennsylvania**

Phosphorous Oxychloride Satin, White — Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Phosphorous Sesquisulfide, 100 lb cs .....lb.	.38	.44	.38	.44	.38	.44
Trichloride, cylinders...lb.	.16	.20	.16	.20	.16	.23
Phthalic Anhydride, 100 lb wks .....lb.	.14½	.15	.14½	.15	.13½	.16
Pigments Metallic, Red or or brown bags, bbls, Pa. wks .....ton	37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drs or bbls. Destructive dist.....lb.	.59	.62	.59	.62	.59	.62
Steam dist. wat. wh. bbls. .....gal.	.64	.65	.64	.65	...	...
Prime bbls.....bbl.	8.00	10.60	8.00	10.60	8.00	10.60
Pitch Hardwood, wks....ton	...	20.00	...	20.00	20.00	25.00
Plaster Paris, tech, 250 lb. bbls. .....bbl.	3.40	3.50	3.40	3.50	3.30	3.50
Platinum, Refined .....oz.	35.00	36.00	35.00	38.00	24.00	38.00
Potash, Caustic, wks, sol..lb.	.06¼	.06½	.06¼	.07⅜	.06⅛	.07⅜
flake .....lb.	.07	.07¼	.07	.08¼	.0705	.08¼
Liquid tanks .....lb.	...	.02⅞	.02⅞	.03⅝	...	...
Potash Salts, Rough Kainit 14% basis† .....ton	...	9.70	...	9.70	...	9.70
Manure Salts, imported 20% basis bulk.....ton	...	8.60	8.60	12.00	...	12.00
30% basis bulk.....ton	...	12.90	12.90	19.15	...	19.15
Domestic, cif ports, blk.unit	...	.43	...	...	...	...
Potassium Acetate.....lb.	.27	.28	.27	.28	.27	.28
Potassium Muriate, 80% basis bags .....ton	...	22.00	22.00	37.15	...	37.15
Domestic, bulk .....unit	...	.40	...	...	...	...
Pot. & Mag. Sulfate, 48% basis bags .....ton	...	22.50	22.50	25.00	25.00	27.80
Potassium Sulfate, 90% basis bags .....ton	...	35.00	35.00	42.15	42.15	47.50
Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb casks .....lb.	.08⅛	.08⅝	.08⅛	.08⅝	.07¼	.08⅝
Binoxalate, 300 lb bbls.lb.	.22	.23	.14	.23	.14	.17
Bisulfate, 100 lb kegs..lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc 800 lb casks.....lb.	.07	.07½	.07	.07½	.04⅞	.07½
Chlorate crystals, powd. 112 lb keg wks.....lb.	...	.09	.08½	.09	.08	.09
Chloride, crys. bbls.....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kegs.....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases..lb.	.55	.60	.55	.60	.50	.60
Iodide, 75 lb. bbls.....lb.	...	1.40	1.40	2.70	2.35	2.70
Metabisulfite, 300 lb bbl.lb.	.10½	.11	.10	.11	.10½	.11
Oxalate, bbls.....lb.	.16	.24	.1[illegible]	.24	.16	.24
Perchlorate, cask wks...lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys. 500 & 1000 lb drs wks lb.	.18½	.19½	.18½	.19½	.17½	.19½
Prussiate, red, 112 lb kg.lb.	.39	.41	.35	.39	.39	.41
Yellow, 500 lb casks..lb.	.18	.19	.18	.19	.16½	.19
Tartrate Neut, 100 lb kg.lb.	...	.21	...	.21	...	.21
Titanium Oxalate, 200 lb bbls. .....lb.	.32	.35	.32	.35	...	...
Propane, group 3, tanks.....	...	.07	...	.07	...	.07
Pumice Stone, lump bags.lb.	.04½	.06	.04½	.06	.04	.06
250 lb bbls.....lb.	.05	.07	.05	.07	.04½	.07
Powdered, 350 lb bags..lb.	.02½	.03	.02½	.03	.02½	.03
Putty, commL, tubs...100 lb.	...	2.25	...	2.25	2.00	2.25
Linseed Oil, kegs...100 lb.	4.00	4.50	4.00	4.50	3.40	4.50
Pyridine, 50 gal drums...gal.	...	1.25	...	1.25	.85	1.25
Pyrites, Spanish cif Atlantic ports bulk.....unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP .....lb.	2.75	3.00	2.75	3.00	...	...
Quebracho, 35% liq. tks...lb.	...	.02⅜	.02¼	.02⅜	.02	.02⅜
450 lb bbls c-l.....lb.	...	.02⅞	.02¾	.02⅞	.02⅜	.02⅞
Solid, 63%, 100 lb bales cif .....lb.	...	.02⅞	.02⅞	.03⅜	.02⅜	.03⅜
Clarified, 64%, bales..lb.	...	.03	.03	.03½	.02⅜	.03½
Quercitron, 51 deg liquid 450 lb. bbls.....lb.	.06	.06½	.05½	.06½	.05½	.06
Solid, 100 lb boxes.....lb.	.10	.12	.09½	.13	.09½	.13
Bark, Rough.....ton	...	14.00	...	14.00	...	14.00
Ground .....ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks...lb.	.40	.44	.40	.44	.40	.44
Resorcinol tech, cans ....lb.	.75	.80	.65	.80	.65	.70
Rochelle Salt, cryst.....lb.	.14½	.15	.12½	.16	...	...
Rosin Oil, bbls, first run gal.	...	.45	.45	.48	.42	.46
Second run .....gal.	...	.48	.48	.53	.46	.51
FF Wood Rosin, c.l. NY..	...	5.10	5.10	6.13	...	...
Rosins 600 lb bbls 280 lb..unit ex. yard N. Y.						
B	...	5.35	4.50	5.75	2.75	5.15
D	...	5.40	4.60	5.85	2.95	5.15
E	...	5.45	4.80	6.50	3.55	5.15
F		5.50	5.00	6.75	3.85	5.17½
G		5.55	5.05	6.75	3.90	5.17½
H		5.70	5.10	6.75	4.00	5.17½
I		5.70	5.15	6.75	4.05	5.20
K		5.74	5.30	6.75	4.60	5.20
M		5.75	5.45	6.80	4.35	5.25
N		5.90	5.50	6.80	4.75	5.40
WG		6.25	5.70	6.80	4.80	5.60
WW		6.50	5.90	6.85	4.85	6.20
Rotten Stone, bags mines.ton	23.50	24.00	23.50	24.00	23.50	24.00
Lump, imported, bbls...lb.	.05	.07	.05	.07	.05	.07
Selected bbls.....lb.	.09	.12	.09	.12	.09	.12
Powdered, bbls.....lb.	.02½	.05	.02½	.05	.02	.05
Sago Flour, 150 lb bags..lb.	.02½	.03	.02½	.03	.02½	.03
Sal Soda, bbls wks...100 lb.	1.10	1.10	1.10	1.10	.90	1.10
Salt Cake, 94-96% c-l wks. ton	13.00	18.00	13.00	18.00	13.00	18.00
Chrome .....ton	12.00	13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd granular 450-500 lb bbls...lb.	.059	.06¼	.059	.06¼	.05¾	.06¾
Satin, White, 550 lb bbls..lb.	...	.01½	...	.01½	...	.01½

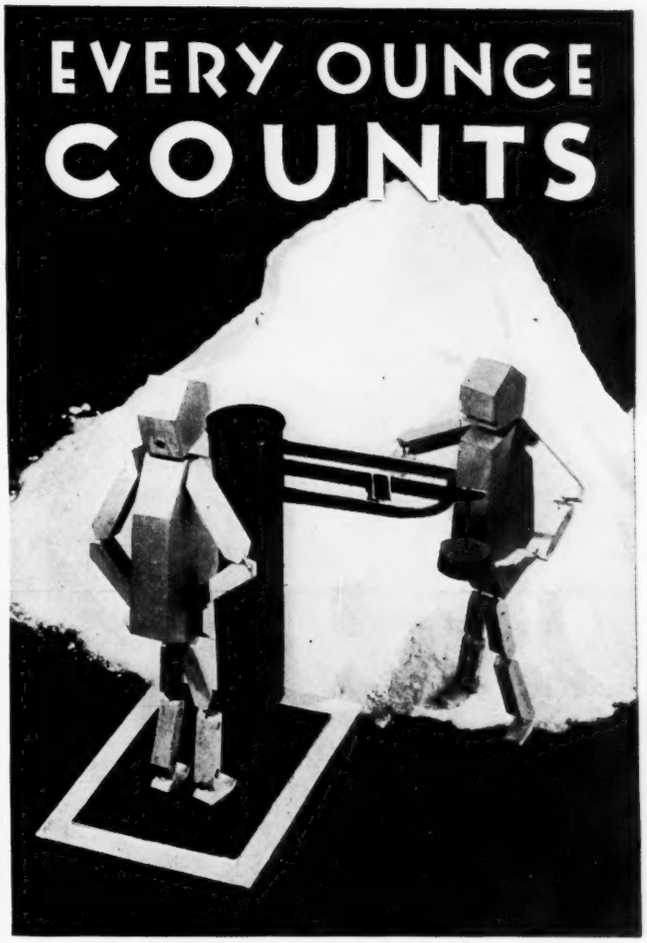
* Higher price is for lcl quantities.
† Plus discounts, based on time of purchase and delivery.

Current

Shellac, Bone Dry
Sulfur, Brimstone

	Current Market		1934 Low	1934 High	1933 Low	1933 High
Shellac Bone dry bbls† ...lb.	.30	.32	.26	.37	.18	.28
Garnet, bags .....lb.	.31	.32	.24	.32	.15	.20
Superfine, bags‡ .....lb.	.25	.28	.23	.31	.09½	.18¾
T. N. bags‡ .....lb.	.22	.25	...	...	...	...
Schaeffer's Salt kegs.....lb.	.48	.50	.48	.50	.48	.50
Silica, Crude, bulk mines.ton	8.00	11.00	8.00	11.00	8.00	11.00
Refined, floated bags...ton	22.00	30.00	22.00	30.00	22.00	30.00
Air floated bags.....ton	...	32.00	...	32.00	...	32.00
Extra floated bags...ton	30.00	35.00	30.00	35.00	30.00	35.00
Silver Nitrate, vials .....oz.	...	.37¾	.31⅞	.37⅜	...	...
Soda Ash, 58% dense, bags c-l wks.....100 lb.	...	1.25	...	1.25	1.17½	1.25
58% light, bags....100 lb.	...	1.23	...	1.25	1.17½	1.23
Soda Caustic, 76% grnd & flake drums.....100 lb.	...	3.00	...	3.00	2.90	3.00
76% solid drs.....100 lb.	...	2.60	...	2.60	2.50	2.60
Liquid sellers tanks, 100 bls.	...	2.25	...	2.25	2.15	2.25
Sodium Abietate, drs.....lb.	...	.08	.03	.08	...	.03
Acetate, tech 450 lb. bbls wks .....lb.	.04½	.05	.04½	.05	.04¼	.05
Alignate, drs. .....lb.	...	.64	.50	.64	...	.50
Aresenate, drums.....lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
Arsenite, drums.....gal.	.40	.75	.40	.75	.95	.75
Benzoate U.S.P., kegs..lb.	.46	.48	.45	.48	...	...
Bicarb, 400 lb bbl...100 lb.	...	2.25	...	2.25	...	2.25
Bichromate, 500 lb cks wks. .....lb.	.06½	.06⅝	.06⅛	.06⅝	.044	.07
Bisulfite, 500 lb bbl wks.lb.	.03¼	.036	.03	.036	.02¾	.0335
Chlorate, wks.....lb.	.06¼	.07½	.06¼	.07½	.05¾	.07¾
Chloride, technical.....ton	13.60	16.50	11.40	16.50	11.40	14.00
Cyanide, 96-98%, 100 & 250 lb. drums wks.....lb.	.15½	.16½	.15½	.16½	.15½	.16
Fluoride, 300 lb bbls wks .....lb.	.07½	.09½	.07½	.09½	.07	.07½
Hydrosulfite, 200 lb bbls f.o.b wks.....lb.	.19½	.21	.19½	.21	.20	.21
Hypochloride solution, 100 lb. cbys. .....lb.	...	.05	...	.05	...	.05
Hyposulfite, tech, pea crys 375 lb bbls wks..100lb.	2.40	3.00	2.40	3.00	2.40	3.00
Technical, regular cryst. 375 lb bbls wks.100 lb.	2.40	2.65	2.40	2.65	2.40	2.65
Iodide .....lb.	...	2.40	2.40	3.50	3.10	3.50
Metanilate, 150 lb bbls..lb.	.41	.42	.41	.42	.44	.45
Metasilicate, c-l, wks.100 lb.	2.65	3.05	2.65	3.05	2.65	3.25
Monohydrate, bbls.....lb.	...	.02½	...	.02½	...	.02½
Napthenate .....lb.	...	.13	...	.13	...	...
Naphthionate, 300 lb bbl.lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-l NY.....ton	...	24.80	24.80	26.30	1.26z	1.31½z
100 lb. bags .....ton	...	25.50	25.50	27.00	...	...
Bulk .....ton	...	23.50	23.50	24.50	...	...
Nitrite, 500 lb bbls spot.lb.	.07¼	.08	.07¼	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks.lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls..lb.	.18	.19	.18	.19	.17	.19
Peroxide, bbls. 400 lb...lb.	...	.17	...	.17	...	...
Phosphate, di-sodium, tech. 310 lb bbls,wks.100 lb.	...	2.20	2.10	2.40	2.00	2.40
tri-sodium, tech, 325 lb bbls, wks .....100 lb.	...	2.60	2.60	2.70	2.15	2.50
Picramate, 160 lb kegs..lb.	.67	.69	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bbl. wks.....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb kg.lb.	.16½	.18	.16½	.18	.15	.20
Silicate, 60 deg 55 gal drs, wks. .....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40 deg 35 gal drs, wks .....100 lb.	...	.80*	...	.80*	.75	.80
Silicofluoride, 450 lb bbls NY .....lb.	.04¾	.05	.04¾	.06	.04½	.06
Stannate, 100 lb. drums.lb.	.33½	.36	.33½	.37½	.18	.37
Stearate, bbls.....lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb. bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-l wks.....lb.	.022	.0285	.022	.0285	.02	.0285
Sulfide, 80% crystals, 440 lb bbls wks.....lb.	...	.02¼	.02¼	.02½	.02½	.02¾
62% solid, 650 lb drums c-l wks.....lb.	...	.03	...	.03	...	.03
Sulfite, crystals, 400 lb bbls wks .....lb.	.02¼	.02½	.02¼	.02½	.03	.03¼
Sulfocyanide, bbls.....lb.	.28	.35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs .....lb.	.83	.88	.70	.88	.57	.67
Spermaceti, blocks, cases..lb.	...	.20	.18	.20	.17	.22
Cakes, cases .....lb.	...	.21	.19	.21	.18	.23
Spruce Extract, ord., tks..lb.	...	.01	...	.01	.00⅞	.01
Ordinary, bbls.....lb.	...	.01¼	...	.01½	.01¼	.01½
Super spruce ext, tks....lb.	...	.01⅜	...	.01⅜	.01¼	.01⅜
Super spruce ext., bbls..lb.	...	.01⅞	...	.01⅞	.01⅜	.01⅞
Super spruce ext, powd., bags .....lb.	...	.04	...	.04	...	.04
Starch, powd, 140 lb bags .....100 lb.	3.36	3.56	2.81	3.76	2.29	3.01
Pearl, 140 lb bags...100 lb.	3.46	3.66	2.71	3.66	2.19	2.91
Potato, 200 lb bags.....lb.	.05¼	.06	.05¼	.06	.03¾	.06
Imported bags .....lb.	.06	.06½	.06	.06½	.04¾	.06½
Starch, Potato Soluble....lb.	.08	.08½	.08	.08½	.08	.08½
Rice, 200 lb bbls.....lb.	.07½	.08½	.07½	.08½	.07	.08½
Wheat, thick bags.....lb.	.06¼	.06¾	.06¼	.06¾	.05¾	.06¾
Thin bags.....lb.	.10	.10¼	.10	.10¼	.09½	.10¼
Strontium carbonate, 600 lb. bbls wks.....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls NY.lb.	.10½	.11	.10½	.11	.07	.11
Peroxide, 100 lb drs....lb.	...	1.25	...	1.25	...	1.25
Sulfur Brimstone, bkn. rock, 250 lb bag c-l....100 lb.	...	2.05	...	2.05	...	2.05

* Tanks, 15c less; † Bone dry and refined shellac prices at Chicago, 1c higher; Boston, ½c; Pacific Coast, 3c; Philadelphia deliveries, fob, N. Y. City. ‡ T. N. and superfine prices quoted fob, N. Y. City and Boston; Chicago prices, 1c higher; Philadelphia deliveries, fob, N. Y. City. z Price per 100 lbs.



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U. S. Pat. 1898707

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(Anhydrous Calcium Sulfate)
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Sulfur, Brimstone
Zinc Cyanide

Prices

		Current Market	1934 Low	1934 High	1933 Low	1933 High
Sulfur	...	.27	.20	.29	.08½	.17¾
Crude, f.o.b. mines	ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bgs c-l NY	100 lb.	...	2.40	...	2.40	...	2.40
Heavy bags c-l	100 lb.	...	2.50	...	2.50	...	2.50
Flowers, 100%, 155 lb bbls c-l NY	100 lb.	...	3.45	...	3.45	...	3.45
Roll, bbls l-c-l NY	100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks	lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb. drs wks	lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl	lb.	.07	.08	.07	.08	.07	.08
Extra, dry, 100 lb cyl	lb.	.11	.13	.11	.13	.10	.13
Sulfuryl Chloride	lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, ground	ton	62.00	63.00	62.00	75.00	50.00	75.00
Talc, Crude, 100 lb bags NY	ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bags NY	ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY	ton	27.50	30.00	27.50	30.00	18.00	30.00
Refined, white, bags	ton	45.00	60.00	45.00	60.00	35.00	60.00
Italian, 220 lb bags to arr.	ton	70.00	75.00	70.00	75.00	48.50	75.00
Refined, white bags NY	ton	75.00	80.00	75.00	80.00	50.00	80.00
Superphosphate, 16% bulk, wks	ton	...	8.50	8.00	8.50	6.50	8.00
Run of pile	ton	...	8.00	7.50	8.00	6.00	7.50
Tankage Ground NY	unit	...	2.60*	2.50*	3.25*	1.70	2.75*
Unground	unit	...	2.25*	2.00*	2.75*	2.35*	2.60*
Fert. grade f.o.b. Chicago	unit	...	1.55*	1.80	2.40*	1.40	3.00
South American cif	unit	...	2.85*	2.75	3.10*	...	2.50
Tapioca Flour, high grade bgs.	lb.	.03	.05	.03	.05	.03	.05
Medium grade, bgs	lb.	.03	.04	.03	.04	.03	.04
Tar Acid Oil, 15%, drs	gal.	.21	.22	.21	.22	.20	.22
25% drums	gal.	.23	.24	.23	.24	.22	.24
Tartar Emetic, Tech	gal.	...	.22¾	.23	.23	...	...
U. S. P.	gal.	.28	.28½	.27	.28½	...	...
Terra Alba Amer. No. 1, bgs or bbls mills	100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bgs or bbls	100 lb.	1.00	1.25	1.00	1.25	1.00	1.25
Imported bags	lb.	.01⅛	.01¼	.01⅛	.01¼	.01⅛	.01¼
Tetrachlorethane, 50 gal dr	lb.	.08½	.09	.08½	.09	.08½	.09
Tetralene, 50 gal drs wks	lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl	lb.	.20	.25	.20	.25	.25	.28½
Tin							
Crystals, 500 lb bbls wks	lb.	.38	.38½	.30	.40½	.24	.41
Metal Straights NY	lb.	...	.512	.50⅞	.55⅜	.23	.57
Oxide, 300 lb bbls wks	lb.	.56	.58	.55	.60	.27½	.59
Tetrachloride, 100 lb drs wks.	lb.	.25½	.26	.25½	.28½	.26	.28
Titanium Dioxide 300 lb. bbl.	lb.	.17¼	.19¼	.17¼	.19¼	.17¼	.19¼
Calcium Pigment, bbls	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Toluene, 110 gal drs	gal.	...	.35	...	.35	...	.35
8000 gal tk cars wks	gal.	...	.30	...	.30	...	.30
Toluidine, 350 lb bbls	lb.	.88	.89	.88	.89	.88	.89
Mixed, 900 lb drs wks	lb.	.27	.28	.27	.28	.27	.28
Toner Lithol, red, bbls	lb.	.75	.80	.75	.85	.80	.95
Para, red, bbls	lb.	...	.75	.75	.80	...	.80
Toluidine	lb.	...	1.35	...	1.35	1.35	1.55
Triacetin, 50 gal drs wks	lb.	.32	.36	.32	.36	.32	.36
Triamyl Borate, drs, wks	lb.	...	.40	...	.40	...	...
Triamylamine, drs, wks	lb.	...	1.25	1.00	1.25	...	...
Trichlorethylene, 50 gal dr	lb.	.09½	.10	.09½	.10	.09½	.10
Triethanolamine, 50 gal drs	lb.	.35	.38	.35	.38	.35	.38
Tricresyl Phosphate, drs	lb.	.19	.26	.19	.26	.19	.26
Triphenyl guanidine	lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums	lb.	.37	.39	.37	.39	.37	.39
Tripoli, 500 lb bbls	100 lb.	.75	2.00	.75	2.00	.75	2.00
Tungsten, Wolframite	per unit	15.00	15.25	12.00	15.25	10.00	12.50
Turpentine carlots, N Y dock bbls	gal.	...	.53	.46¼	.63½	.46¼	.51½
Savannah, bbls	gal.	...	.48	.41¼	.58½	...	...
Jacksonville, bbls	gal.	...	.48	.41¼	.58½	...	...
Wood Steam dist, bbls, c-l N. Y.	gal.	...	.45	.41	.61	.42	.48
Urea, pure, 112 lb cases	lb.	.15½	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f.	ton	100.00	120.00	90.00	120.00	82.60	90.00
c.i.f. S. points	ton	100.00	120.00	90.00	120.00	82.60	90.00
Urea Ammonia liq 55% NH_3, tanks	unit	...	.96	...	.96	...	...
Valonia beard, 42%, tannin bags	ton	...	48.00	39.00	48.00	27.50	42.00
Cups, 32% tannin	ton	...	28.50	23.00	28.50	17.00	25.00
Mixture, bark, bags	ton	...	32.00	...	32.00	22.00	28.00
Vermillion, English, kegs	lb.	1.56	1.70	1.41	1.73	1.05	1.42
Vinyl Chloride, 16 lb cyl	lb.	...	1.00	...	1.00	...	1.00
Wattle Bark, bags	ton	...	29.50	29.50	34.00	24.00	32.00
Extract 55%, tks, bbls	lb.	...	.03¾	.03⅝	.03¾	.03	.03¾
Whiting, 200 lb bags, c-l wks	100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-l NY	ton	...	15.00	...	15.00	13.00	15.00
Gliders, bags c-l NY	100 lb.	...	1.35	...	1.35	...	1.35
Wood Flour, c-l	bags	18.00†	30.00	18.00†	30.00	18.00	36.00
Xylene, 10 deg tks wks	gal.	...	.29	...	.29	.29	.29
Commercial, tks wks	gal.	...	.26	...	.26	...	.26
Xylidine, crude	lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls	lb.	.04¾	.05	.04¾	.05	.04¾	.05
Carbonate Tech., bbls NY	lb.	.09½	.11	.09½	.11	.09½	.11
Chloride Fused, 600 lb drs wks.	lb.	.04¼	.05	.04¼	.05	.05	.05¾
Gran, 500 lb bbls wks	lb.	...	.05⅛	.05⅛	.06	.05¾	.06
Soln 50%, tks wks	100 lb.	...	2.00	...	2.00	...	3.00
Cyanide, 100 lb drums	lb.	.36	.41	.36	.41	.38	.39

* &10. † Depends upon grade.

Current

Zinc Dust
Whale Oil

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Zinc Dust, 500 lb bbls c-l wks ..... lb.	...	.0582½	.0582½	.071	.04¾ .07½
Metal, high grade slabs c-l N Y .....100 lb.	...	4.20	4.20	4.87	3.02 5.37
Oxide, Amer., bags wks. lb.	.05¼	.06¼	.05¾	.06¼	.05 .06
French, 300lb bbls wks. lb.	.05¾	.11⅛	.05¾	.11⅛	.05¾ .11⅛
Palmitate, bbls. .....lb.	.21	.22	.20	.22	.17½ .21
Perborate, 100 lb drs..lb.	...	1.25	...	1.25	... 1.25
Peroxide, 100 lb drs....lb.	...	1.25	...	1.25	... 1.25
Resinate, fused, dark, bbls. ..... lb.	.05¾	.06½	.05¾	.05½	.05¾ .06¼
Stearate, 50 lb bbls.....lb.	.18	.21	.18	.21	.15 .19
Sulfate, crystals, 400 lb bbl wks .....lb.	.028	.033	.02¾	.033	.03 .03½
Flake, bbls .....lb.	.032	.037	...	...	... ...
Sulfide, 500 lb bbls.....lb.	.13	.13½	.13	.13½	.12 .13½
Sulfocarbolate, 100 lb keg. lb.	.21	.22	.21	.22	.21 .22
Zirconium Oxide, Nat. kegs. lb.	.02½	.03	.02½	.03	.02½ .03
Pure kegs .....lb.	.45	.50	.45	.50	.45 .50
Semi-refined kegs .....lb.	.08	.10	.08	.10	.08 .10
Oils and Fats					
Castor, No. 1, 400 lb bbls. lb.	...	.09¾	...	.09¾	.09¼ .10
No. 3, 400 lb bbls.....lb.	...	.09¾	...	.09¾	.08½ .09¾
Blown, 400 lb bbls.....lb.	.11½	.12¼	.11½	.12¾	.11¼ .12¾
China Wood, bbls spot NY lb.	.09	.09	.07½	.099	.04⅞ .09⅛
Tanks, spot NY .....lb.	.085	.086	.07¼	.094	.04¼ .08½
Coast, tanks .....lb.	.083	.084	.06⅞	.094	.04⅝ .08⅛
Coconut, edible, bbls NY..lb.	...	.04¾	.04¾	.10¾	... .10¾
Manila, bbls NY .....lb.	...	.04⅛	.03¾	.04¼	.03⅞ .04¾
Tanks, NY .....lb.	...	.03⅛	.02⅝	.03¼	.02¾ .03¾
Tanks, Pacific Coast .lb.	...	.02⅞	.02¼	.03	.02½ .03⅜
Cod, Newfoundland, 50 gal. bbls. .....gal.	.38	Nom.	.34	.40	.19 .35
Copra, bags, NY.....lb.	...	.0165	.012	.017	.0152½ .019
Corn, crude, bbls NY ..lb.	.08¾	.08⅛	.04⅝	.087⅛	.04⅝ .07¾
Tanks, mills .....lb.	...	.07¾	.03½	.07¾	.02⅞ .06½
Refined, 375 lb bbls NY.lb.	.09¾	.09⅞	.05¾	.09⅞	.05¾ .08¾
Degras, American, 50 bal bbls N Y .....lb.	.03¾	.04¾	.02¾	.04¾	.02½ .03
English, brown, bbls NY.lb.	.07⅜	.04½	.03¾	.04	.02⅞ .04
Greases.					
Yellow .....lb.	.04⅝	.04⅞	.02⅜	.04⅞	.01¾ .03⅝
White, choice bbls NY..lb.	.04⅝	.05½	.02¾	.05½	.02½ .04⅝
Herring, Coast, tanks....gal.	.17	Nom.	.15	.15	.11 .23
Lard Oil, edible, prime....lb.	...	.09¾	...	.09¾	.08½ .10½
Extra, bbls .....lb.	...	.08	.07	.08	.07½ .08¼
Extra No. 1, bbls.....lb.	...	.07¾	.06⅜	.07¾	.06 .08
Linseed, Raw, less than 5 bbl. lots .....lb.	...	.095	.095	.105	.08 .12
bbls. c-l spot.....lb.	...	.087	.087	.101	.072 .11
Tanks .....lb.	...	.081	.081	.095	.066 .104
Menhaden, Tanks, Baltimore ..... gal.	.21	.25	.15	.25	.09 .15
Refined, alkali bbl....lb.	...	.062	.057	.069	... ...
Tanks .....lb.	...	.056	.051	.061	... ...
Light Pressed, bbls.....lb.	...	.056	.051	.057	... ...
Tanks .....lb.	...	.05	.045	.05	... ...
Neatsfoot, CT, 20°bbls NY.lb.	...	.16½	...	.16½	.11¾ .16¾
Extra, bbls NY .....lb.	...	.08	.07	.08	.06½ .08¼
Pure, bbls NY .....lb.	...	.12	.12	.13	.07¾ .14
Oleo, No. 1, bbls NY....lb.	...	.11½	.06	.11½	.05 .06⅞
No. 2, bbls NY.....lb.	...	.11¼	.05⅜	.11¼	.04¼ .06⅜
Olive, denat, bbls NY....gal.	.84	.86	.76	.90	.47 .80
Edible, bbls NY .....gal.	1.55	1.70	1.55	1.90	1.30 1.85
Foots, bbls NY .....lb.	...	.06⅝	.06½	.07⅜	.04⅜ .06¾
Palm, Kernel, casks.....lb.	.0285	Nom.	.02½	.04¼	.04 .04¾
Lagos, 1500 lb casks....lb.	...	.037⅛	.03⅝	.037⅛	.025⅛ .04¾
Niger, casks .....lb.	.03¼	.0340	.03¼	.03¾	.024 .04½
Peanut, crude, bbls NY...lb.	...	.09½	.06½	.09½	.03⅛ .07
Refined, bbls. NY .....lb.	.10½	.11	.07½	.11	.07½ .11
Perilla, bbls NY .....lb.	.08¼	.08½	.08¼	.09⅝	.05 .10½
Tanks, Coast .....lb.	.07¾	Nom.	.07½	.09	.03¾ .09¾
Denatured, drms, NY..gal.	.41	.42	.37	.44	.34 .65
Rapeseed, blown, bbls NY.gal.	.08	.082	.08	.082	... ...
Denatured, drms, NY..gal.	...	.38	.37	.44	.34 .65
Red, Distilled ,bbls.....lb.	.07⅜	.08⅜	.06⅞	.08⅜	.05⅞ .07⅝
Tanks .....lb.	...	.06½	.06	.06½	.05 .06
Salmon, Coast, 8000 gal tks ..... gal.	.21	Nom.	.15	.21	.11 .18
Sardine, Pac. Coast tks..gal.	...	.24	.13	.25	.09½ .20
Sesame, edible, yellow, dom.lb.	.12	.12¼	.07½	.13¼	.08½ .10
White, dos. .....lb.	.12	.12¼	.08	.13¼	.10 .11
Soy Bean, crude					
Pacific Coast .....lb.	...	Nom.	...	Nom.	.032 .035
Domestic tanks, f.o.b. mills ..... lb.	...	.06½	.06	.06½	.027 .035
Crude, bbls NY .....lb.	.071	.075	.066	.071	.04 .095
Refined, bbls NY .....lb.	.076	.087	.071	.087	.04½ .106
Sperm, 38° CT, bleached, bbls N Y ..... lb.	.106	.108	.106	.11	... ...
45° CT, bleached, bbls NY ..... lb.	.099	.101	.099	.103	... ...
Stearic Acid, double pressed dist bags ..... lb.	.10	.11	.09	.11	.07½ .10
Double pressed saponified bags .....lb.	.09	.10	.09	.10	.08 .10
Triple pressed dist bags..lb.	.12¾	.13¾	.11¾	.13¾	.10¼ .12¾
Stearine, Oleo, bbls .....lb.	.08¾	.09	.05	.10⅝	.03½ .06¾
Tallow City, extra loose...lb.	...	.05⅛	.02⅞	.05⅛	.02 .03⅞
Edible, tierces .....lb.	...	.06½	.04¾	.06½	.03½ .05⅛
Tallow Oil, bbls, c-l NY.lb.	.05¾	.06	.05¾	.06	.05¾ .06
Acidless, tanks NY.....lb.	...	.07	.06	.07	.05 .07
Vegetable, Coast mats lb.	.07¼	Nom.	.06	.07¼	.04¼ .06
Turkey Red, single, bbls..lb.	.07½	...	.07½	...	.06¼ .07½
Double, bbls .....lb.	.12½	.13	.12½	.13	.08 .13
Whale					
Winter bleach, bbls NY.lb.	...	.072	...	.072	... ...
Refined, nat. bbls. NY..lb.	.068	.07	.068	.07	... ...

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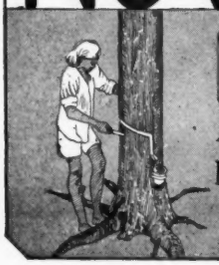
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"We"—Editorially Speaking

Just one year ago, we wrote "A Message to the President" as follows: "Business is standing still because it is afraid to go forward. Most of our business people believe this quite sincerely and we wish, Mr. President, that you would consider carefully the causes of the profound sense of insecurity that grips us all . . . Consider, Mr. President, these three things—the Government's labor policy, your control of our money, the federal budget—and look at them realistically from the point of view of our manufacturers and our merchants, the greatest creators of our national wealth, the employers of most of our labor, the taxpayers upon whom fall the heaviest burdens."

Harry L. Derby began his business career butchering newspapers and magazines on a local train between Binghamton and Buffalo, and he has been a hard-driving salesman ever since. From Casein to Kalbfleisch to Cyanamid sums up his varied chemical experience, and it has been said he has every requisite of a great chemical executive except two—he never drinks an old-fashioned, and he is at his desk at eight-forty-five every morning. He talked in such a new vein at the monthly meeting of the Salesmen's Association that we felt strongly his thoughts should be broadcast to a much wider chemical audience, and the article by him in this issue is the result.

We are mildly surprised that Mr. Hoover did not note in his recently published book that what with so many people going from door to door looking for work, and the strikers picketing so many factories, and the C.C.C. brushing up all the weed-seeds with whisk-brooms, the grass simply has no chance whatever to grow in our city streets.

Excepting only Charlie MacDowell, Elon Huntington Hooker is the most distinguished chemical figure in international affairs, and even though he brands himself a civil engineer in "Who's Who" and has in his record such distinguished and varied titles as Surveyor of the Panama Canal, the Treasurer of the National Progressive Party, he is, and always will be to us, the organizer and active executive head of The Hooker Electrochemical Company, and most of our readers, without reading his interesting address, published in this issue, appreciate that he is one of the rare diplomats of American chemistry.

Below, we are gratified to reprint a review of the new edition of the CHEMICAL GUIDE-BOOK, published in *The Day*.

Chemical Guide Book.

אלע פירמעס, וואס האבן א שייכות
צו די כעמישע אינדוסטריע, זיינען
קלאסיפיצירט אין דעם קאטאלאג.
דאָ נייע אויסגאבע ענטהאלט 246
נייע „קעמיקעלס" און 402 נייע „סי־
נאנימס"
דער קאטאלאג ווערט פרויס־ענטפאנ
גען.

Believe it or not, this is a test for the GUIDE-BOOK.

Professor Warren, Secretary Morgenthau, and President Roosevelt, please note that Dante in his "Paradise Lost" reserves a specially and peculiarly uncomfortable section of hell for "all rulers who rob the people by debasing the currency."

Due to the development of special tank car equipment and the savings resulting from bulk shipments, the use of tank cars has grown rapidly, and, of obvious necessity, a new technique worked out for unloading methods. A. C. White, whose paper on safety in this issue, was delivered at the 23rd Annual Safety Congress, held recently, stresses the desirability of having operators fully acquainted with the chemical and physical properties of the materials they are handling, and suggests that specific methods of loading and unloading should be compiled and recommended as Standard Safety First rules.

Michigan, Diamond, and Hooker certainly deserve to get some sort of a good bonus from some New Deal agency or other "for not raising more hogs this year."

"We" have been jockeyed into an unusual and uncomfortable position of neutrality by the nomination of one of our consulting editors (Dr. Walter S. Landis) and a former consulting editor (Dean Frank Whitmore) for the presidency of the American Chemical Society. If Landis is elected we opine the atomic weight of Au will have to be changed to 100, and if Whitmore wins we warn Editor Howe to hire an extra proofreader. We know them both: both good men; but "We" are going to vote for Jim Farley.

C. L. Mantell and Charles Hardy, coauthors of the article on calcium in this issue, are known to many of our readers respectively as Consulting Metallurgist, and President of Hardy Metallurgical Company. This paper, which we have abstracted, was presented at the Sixty-Sixth General Meeting of the Electrochemical Society.

"We" should like to make a little contribution of our own to the New Deal Nursery Rhymes:

How codes, laws, doles, and quotas grow,
You, nor I, nor Roosevelt know.

Fifteen Years Ago

From our issues of November, 1919

Four dye and chemical companies, American Aniline, Rollin Chemical, Clinchfield Chemical, and Union Dye, confer over $15,000,000 merger.

Additional appropriation of $12,000,000, to enlarge Muscle Shoal's nitrate plant, recommended to Congress.

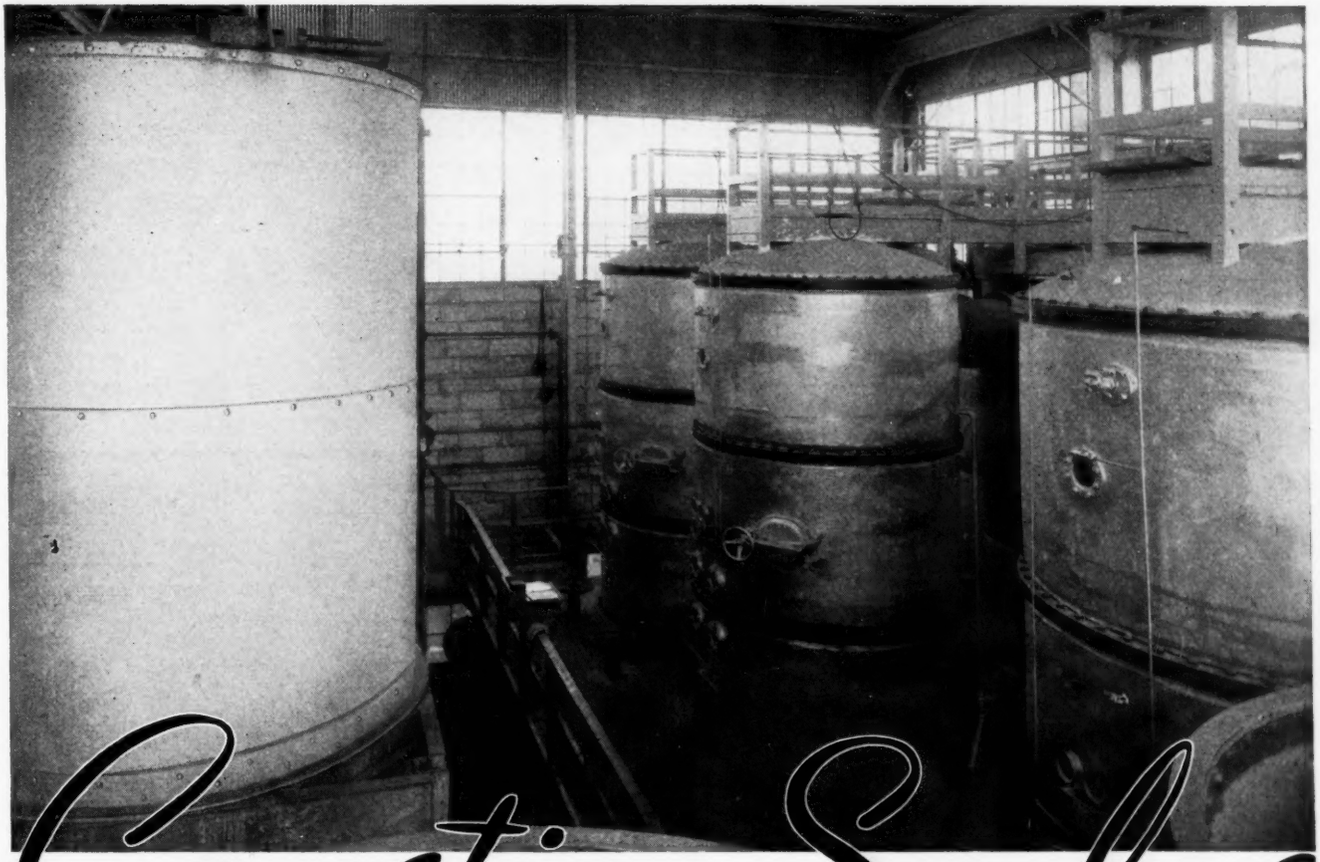
Charles H. MacDowell, President, Armour Fertilizer, made member the Legion d' Honneur, of the French Government, for distinguished services.

Victor Chemical purchases 22 acres at Nashville, Tenn., for plant to be operated in connection with their Tennessee phosphate rock developments. Projected cost more than $500,000.

Governor General, Formosa, announces to Celluloid manufacturers that camphor supply will increase by 4,000,000 pounds beginning next fiscal year.

Lord Leverhulme outlines his six-hour day plan, now in force at his works.

Revival of old rumor that National Aniline is to merge with Barrett causes considerable fluctuations in National stock.



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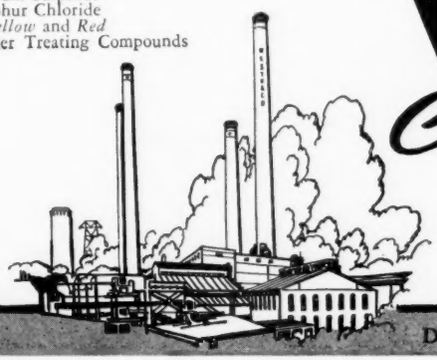

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FORMERLY KNOWN AS "CHEMICAL MARKETS"

VOLUME XXXV DECEMBER, 1934 NUMBER 6

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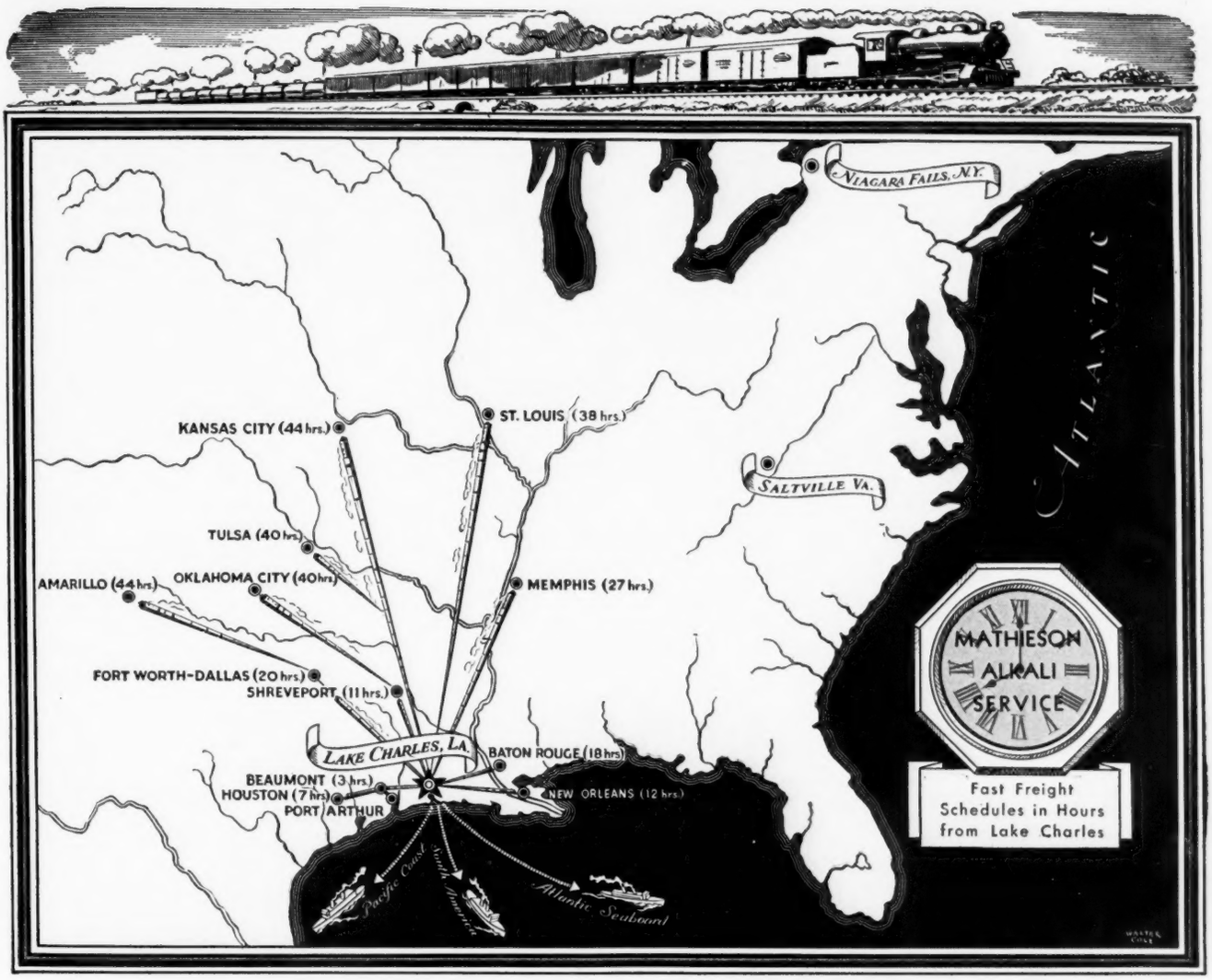

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In addition to speedy rail delivery service, the new Lake Charles Plant offers substantial savings in transportation costs both by rail and by water to consumers in the South and Southwest, and by water to points on the Atlantic and Pacific seaboard, along the Gulf Coast, and on inland waterways including the Mississippi River and its tributaries. Water shipments are loaded on steamers and on barges at our own plant docks at Lake Charles.

We shall be glad to discuss with consumers the advantages of Lake Charles as a source of supply of alkali—in carloads, trainloads or shiploads.

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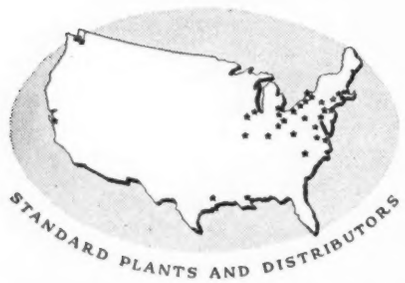

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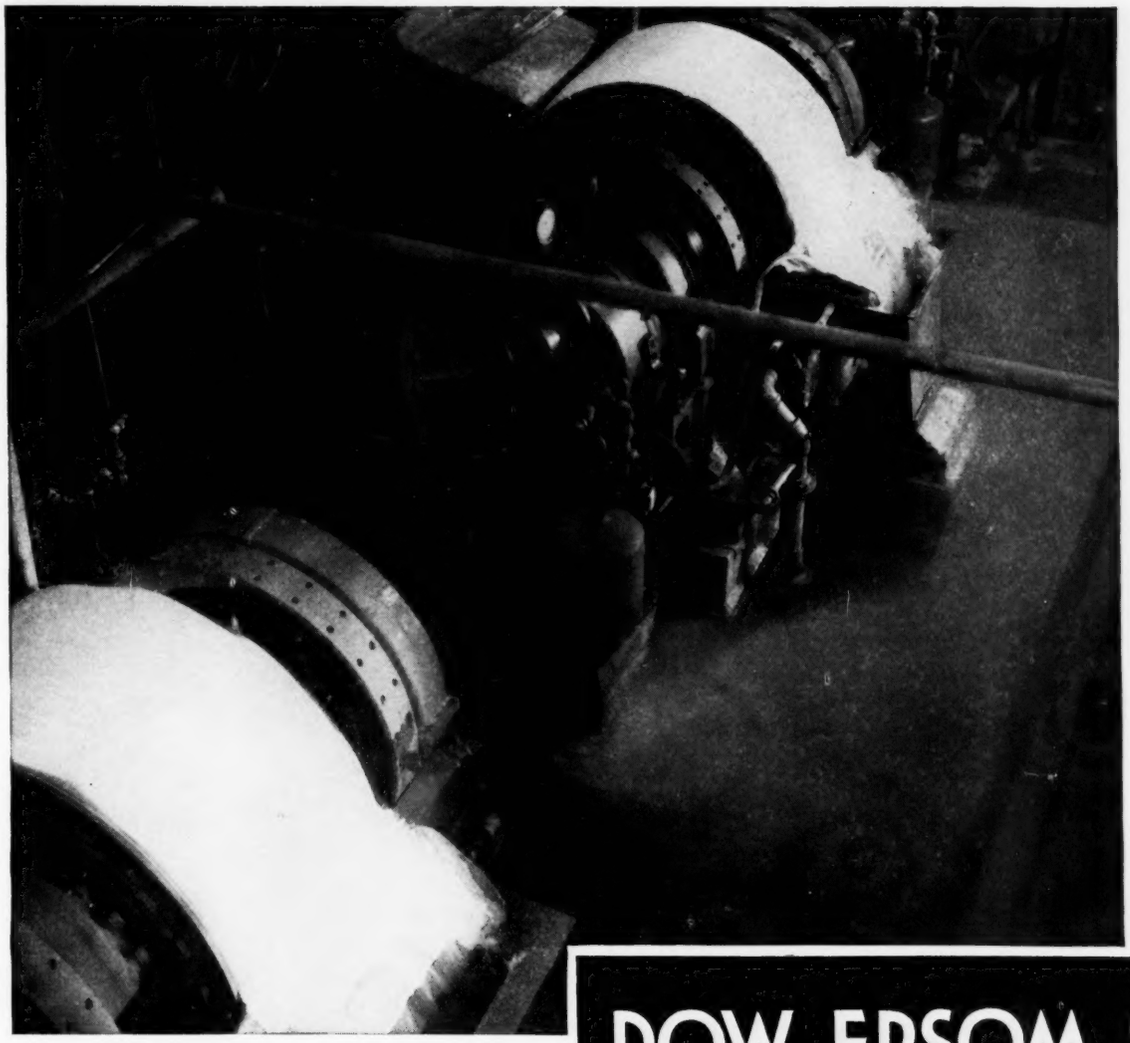

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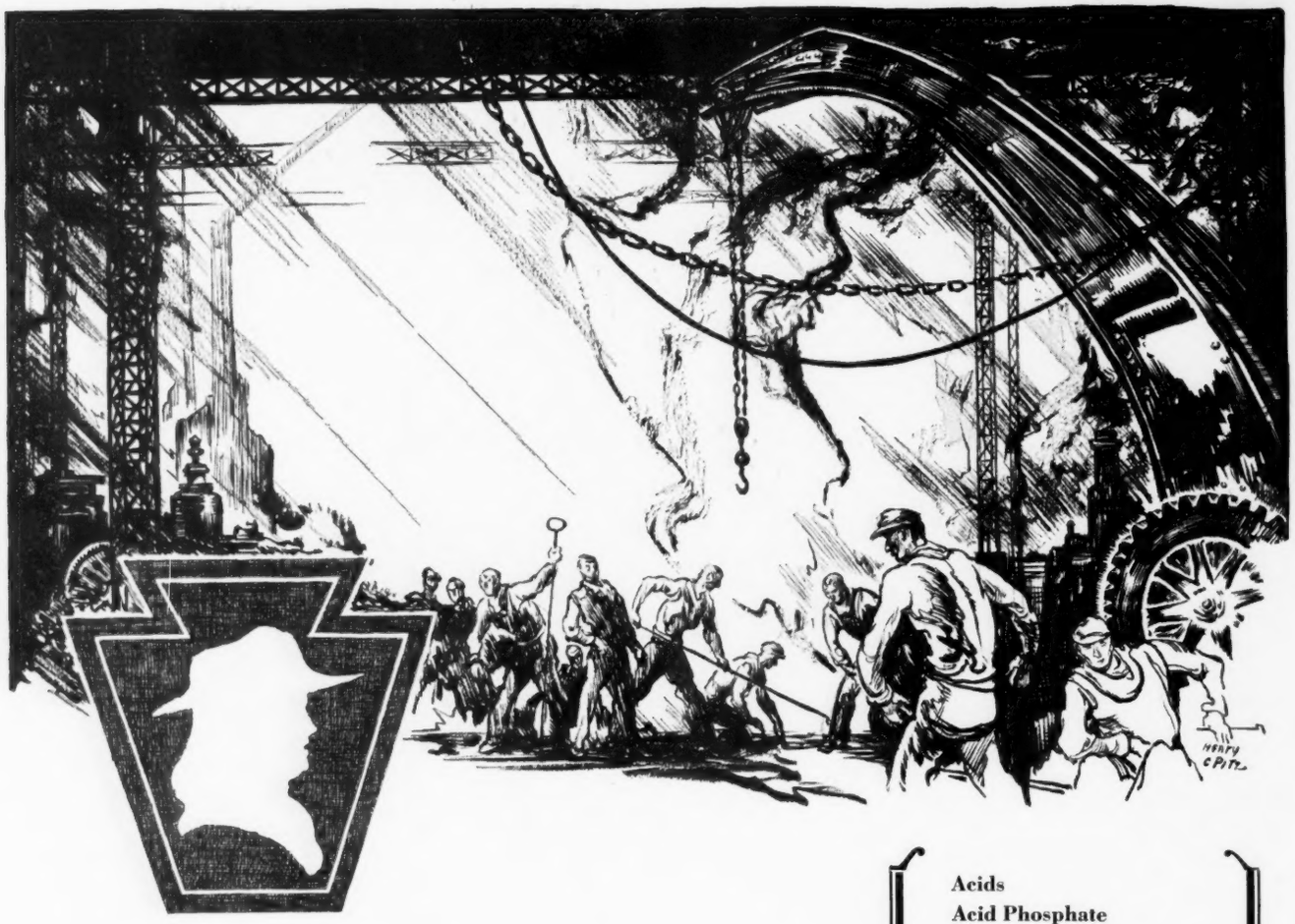

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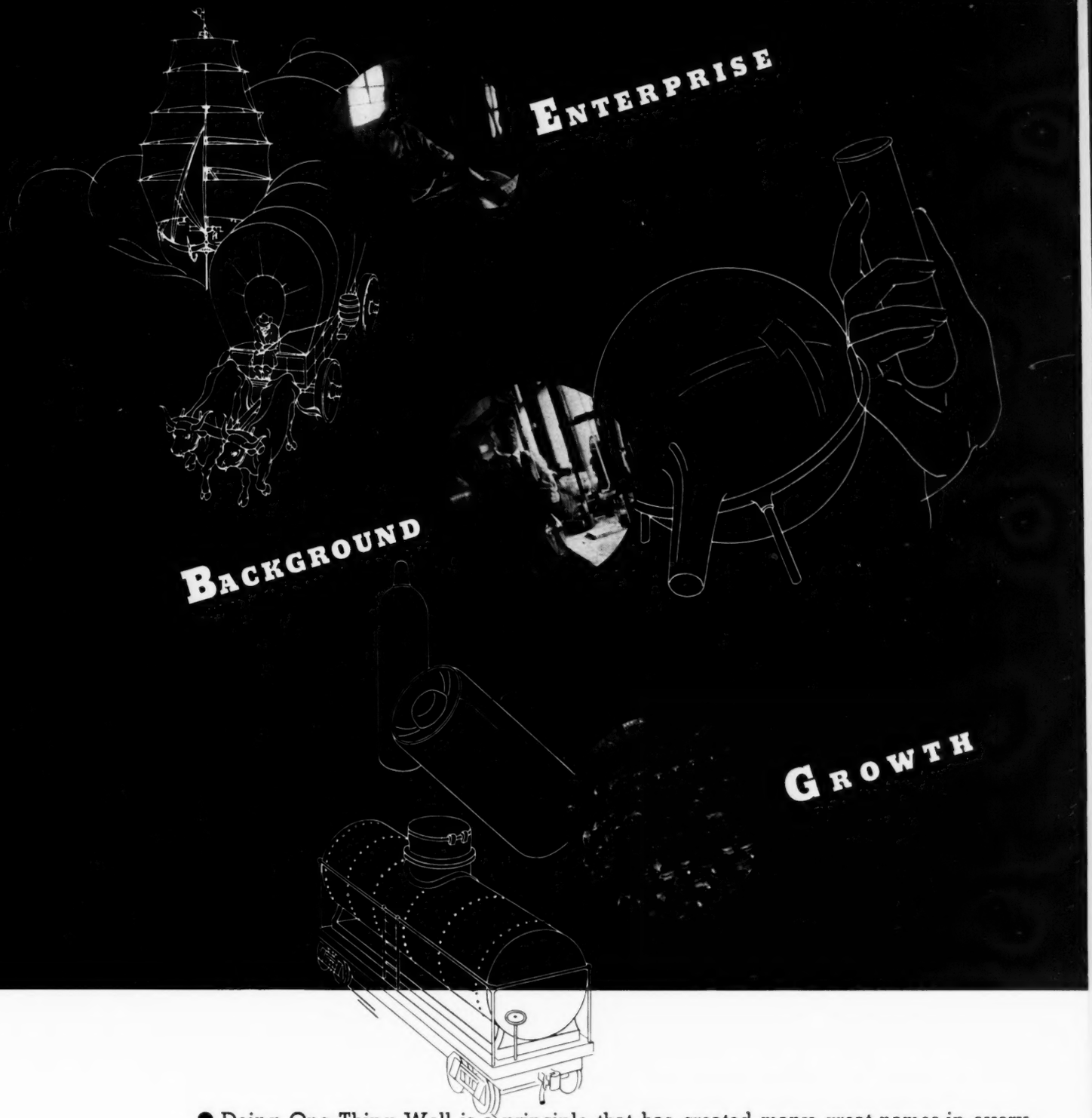

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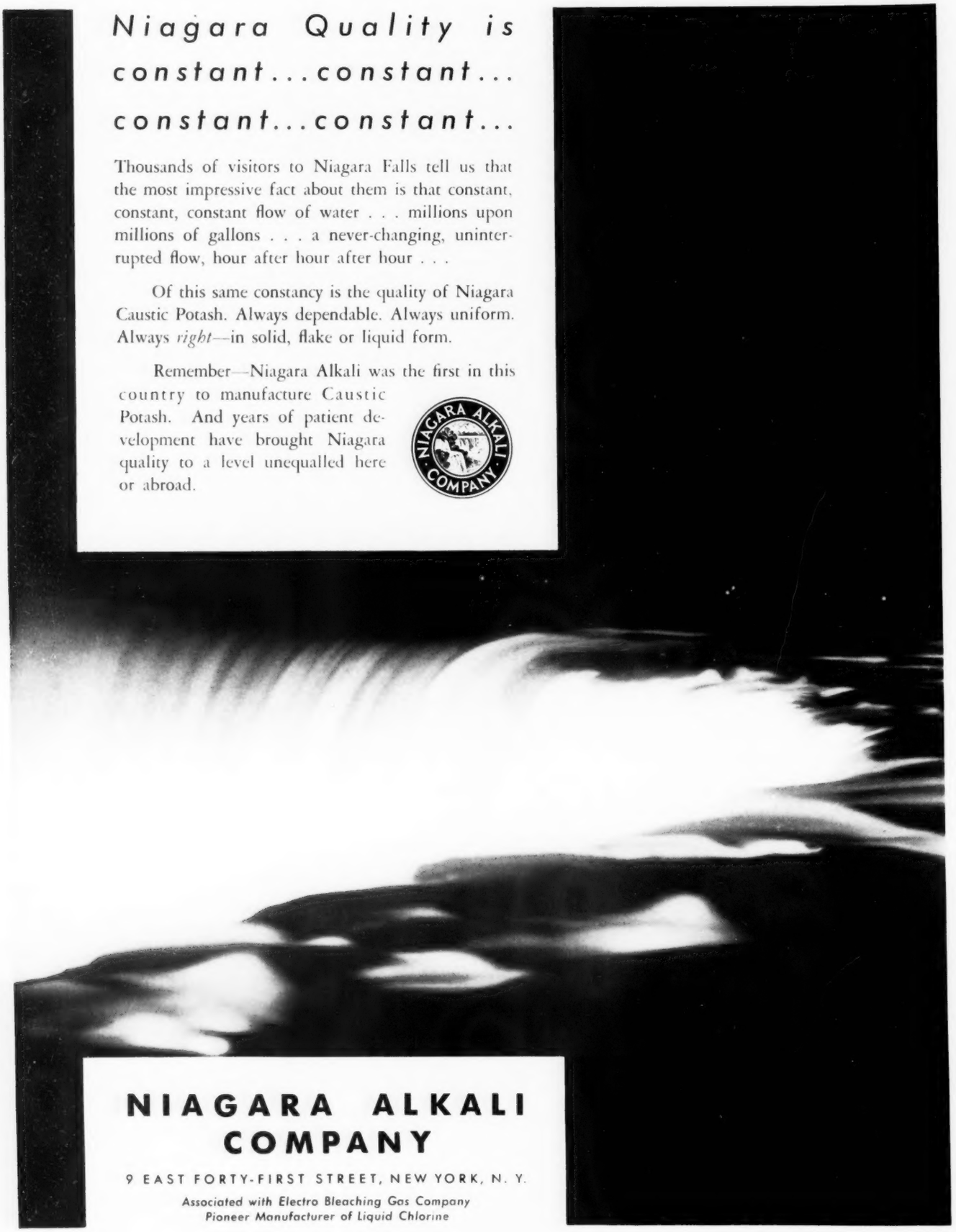

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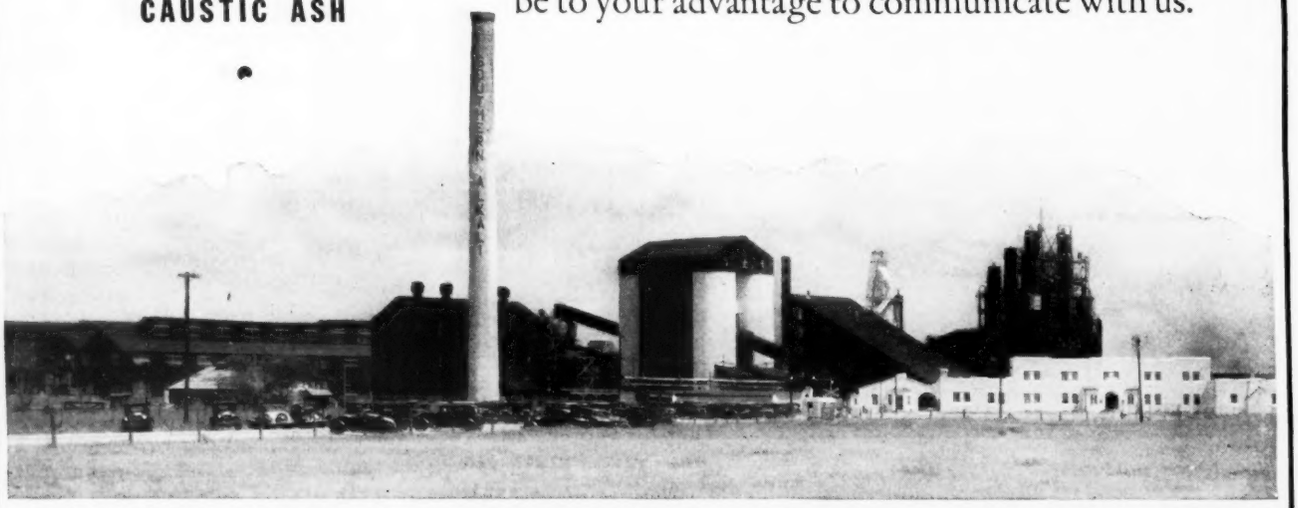

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Ortho Chlor Benzaldehyde
Ortho Chlor Benzoic Acid

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Ortho Nitro Toluene
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